



Upper Niobrara-White Modeling and Potential Scenarios

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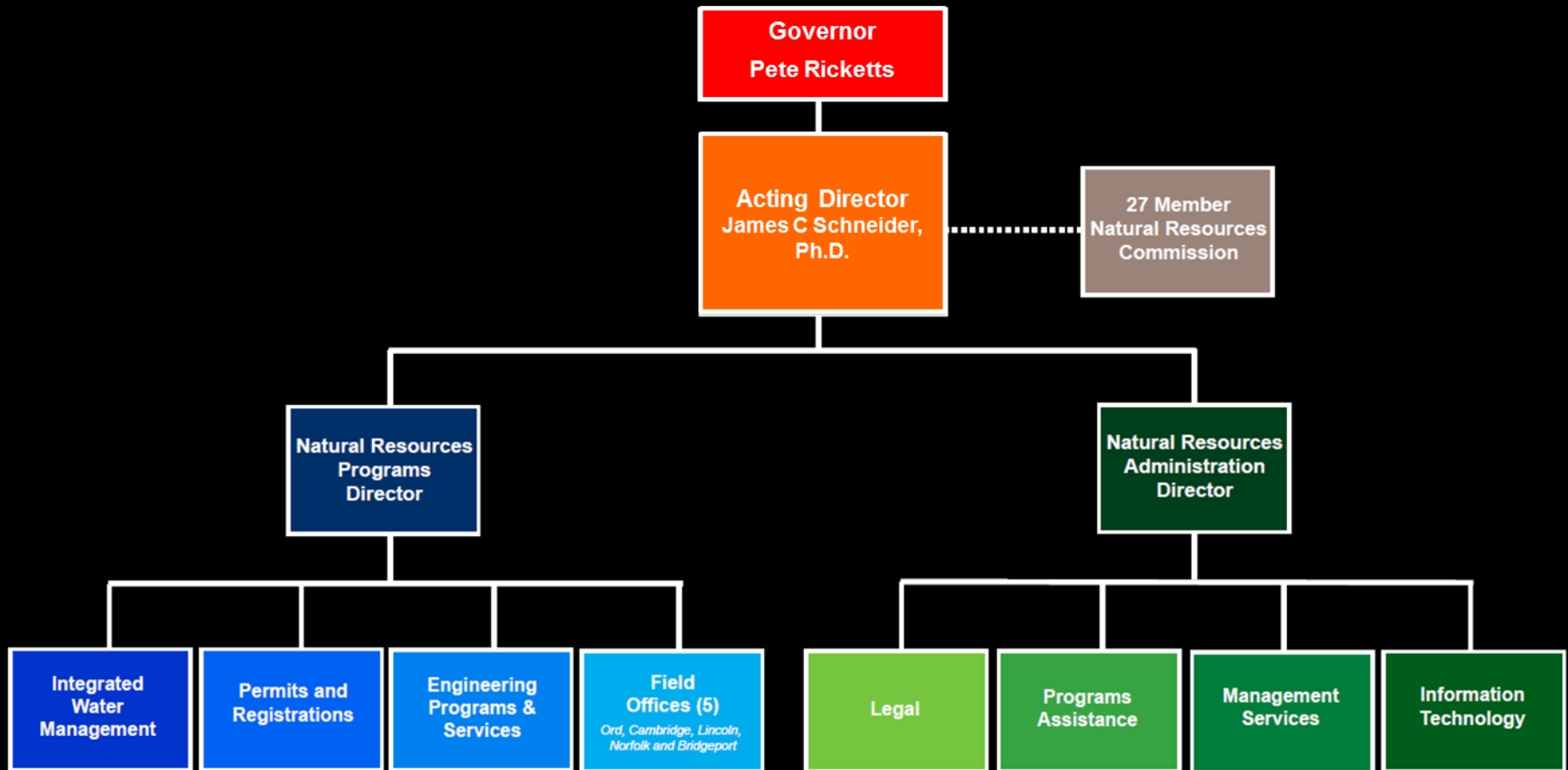


Overview

- Updates from the Department
- Upper Niobrara-White Groundwater Model
 - Bureau of Reclamation WaterSMART Modeling Scenarios
- Basin-Wide Planning
- Your input



Nebraska Department of Natural Resources





DEPARTMENT UPDATES

Floodplain and Dam Safety Activities

- Ice Report (ice jam monitoring site)
 - January 2015 Lower Platte River Ice Jam
<http://dnr.nebraska.gov/fpm/ice-jam>
- Remote operated pipe camera for dam inspections
- Planned floodplain study for Scottsbluff in summer 2015

Ongoing:

- FEMA Risk MAP
- Coordination of the National Flood Insurance Program for Nebraska



For more information,
contact Shuhai Zheng

Data Activities

Streamgaging

- Created real-time streamgaging website
 - Will be uploading historical stream and canal data
<http://data.dnr.nebraska.gov/RealTime>
- New streamgages throughout state
 - In UNWNRD, site added in response to stakeholder input at October meeting
 - Other gages installed after collaboration with NRDs and other stakeholders
- Planned floodplain study in Scottsbluff this summer
- Annual Water Use Reporting website
 - Data will be used in annual IMP reports
<http://data.dnr.nebraska.gov/wateruse>
- NeRAIN website redesign
<http://nerain.dnr.nebraska.gov/nerain/>

For more information,
contact Jeremy Gehle

Permits & Registrations Activities - Ongoing

- Surface Water Permits
 - domestic supply
 - direct irrigation from streams
 - reservoir water for irrigation
 - storage behind a dam
 - generating electricity
 - manufacturing
 - construction
 - fish culture
- Groundwater
 - Transfer Permits
 - Well Registrations
- More Complexity – More Transactions

Permits & Registrations Activities



- Redesign of the well registration database
 - Convenient & centralized location for online registration
 - Additional features added to database based on requests from NRDs, well contractors, scientists, and other state agencies

<http://data.dnr.nebraska.gov/wells/Menu.aspx>

For more information,
contact Mike Thompson

Integrated Water Management Activities

What we do:

Provide
technical expertise,
planning, and
coordination

Develop
models

Conduct
studies

Help water
managers

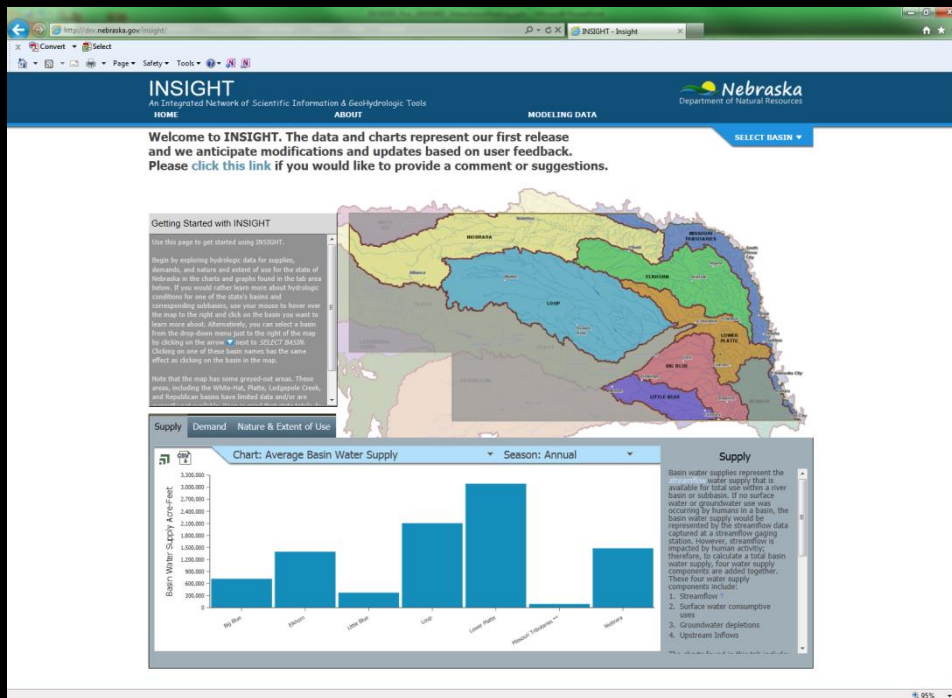
Collaborate
with NRDs
and other
stakeholders

To help better understand:

- Nebraska's water supplies and uses
- The effects of potential water management strategies

INSIGHT: *I*ntegrated *N*etwork of *S*cientific *I*nformation and *G*eo*H*ydrologic *T*ools

<http://dnr.ne.gov/insight/>



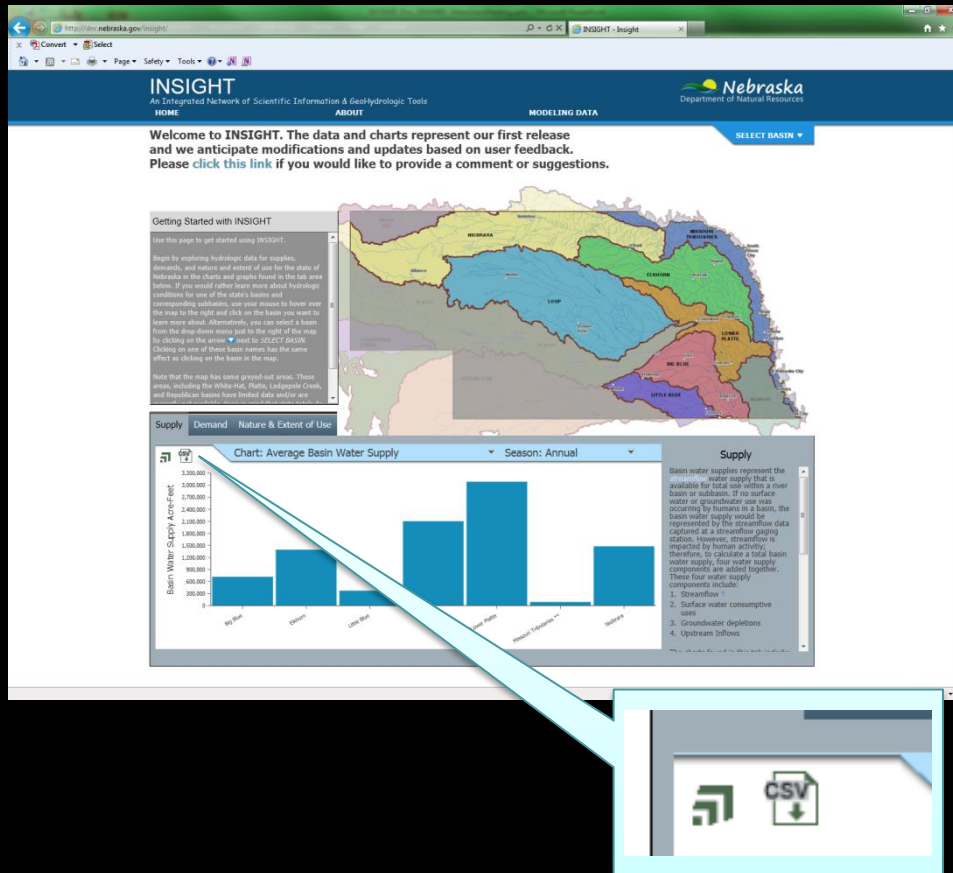
- An annual snapshot of water conditions across the state
- An educational tool for water managers and the public
- A tool to help evaluate water management options

INSIGHT: *Integrated Network of Scientific Information and GeoHydrologic Tools*

- Summary of statewide & basin/sub-basin data
 - ✓ Supply
 - ✓ Demand
 - ✓ Nature & Extent of Use
 - ✓ Balance



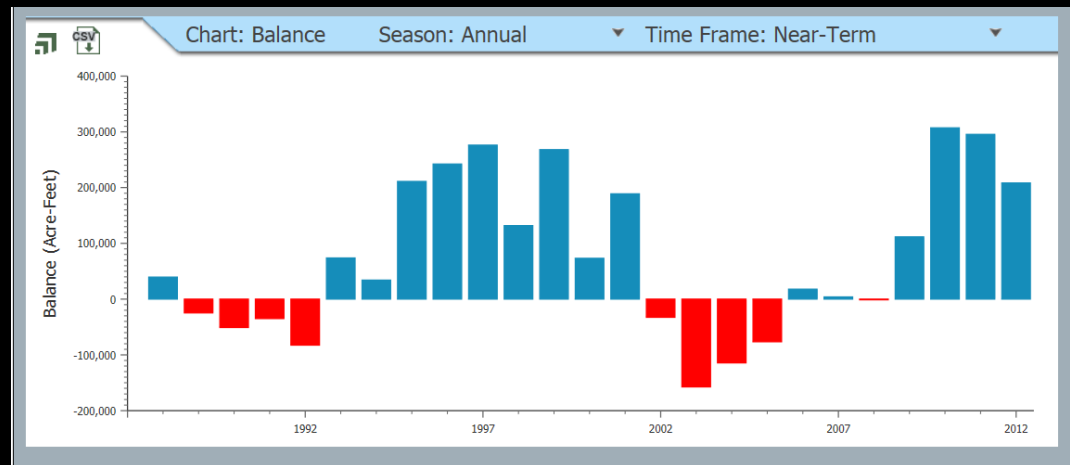
INSIGHT: *Integrated Network of Scientific Information and GeoHydrologic Tools*



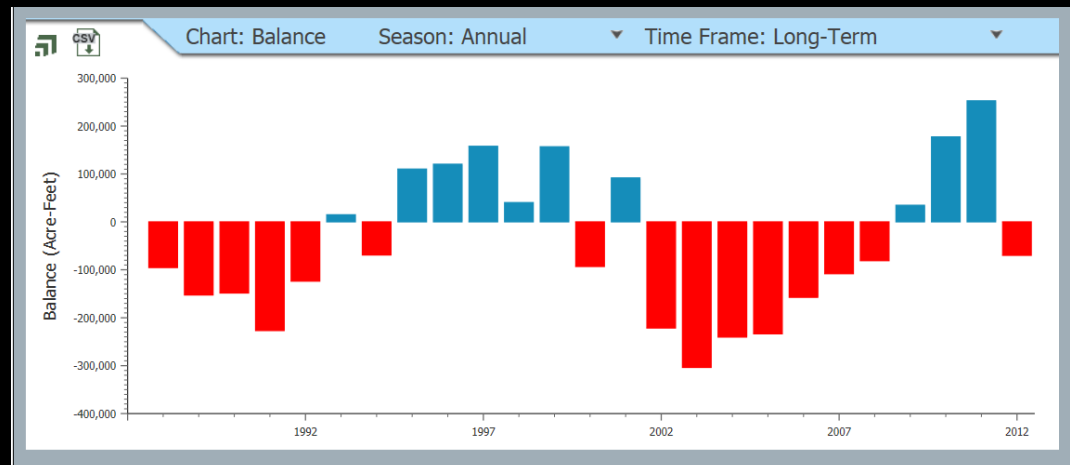
- Recent Updates:
 - Updated data
 - Fixed cosmetic issues
 - Added new charts & features
 - New data download option

INSIGHT: Niobrara Basin

Near-term balance of water supplies and uses in the Niobrara Basin



Long-term balance of water supplies and uses in the Niobrara Basin





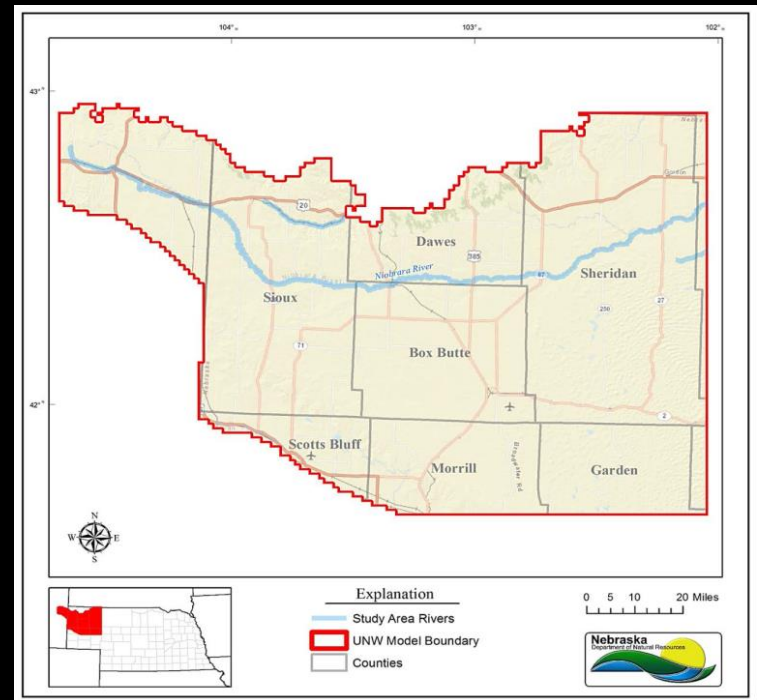
**QUESTIONS ON
UPDATE?**

UPPER NIOBRARA-WHITE GROUNDWATER MODEL



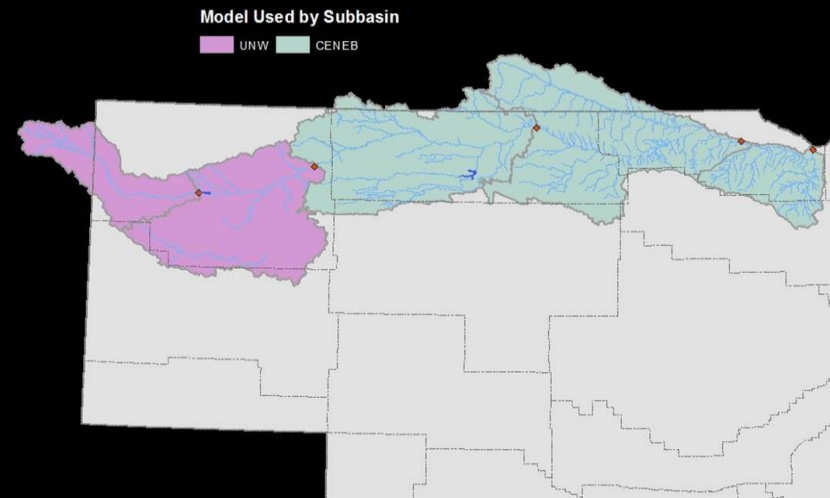
Upper Niobrara-White Groundwater Model

- UNW Model is up and running
- Will assist in the analysis of water supplies and uses in the UNWNRD
- A tool to assist in the integrated management planning (IMP) process
- Used to evaluate hydrologically connected areas and management scenarios



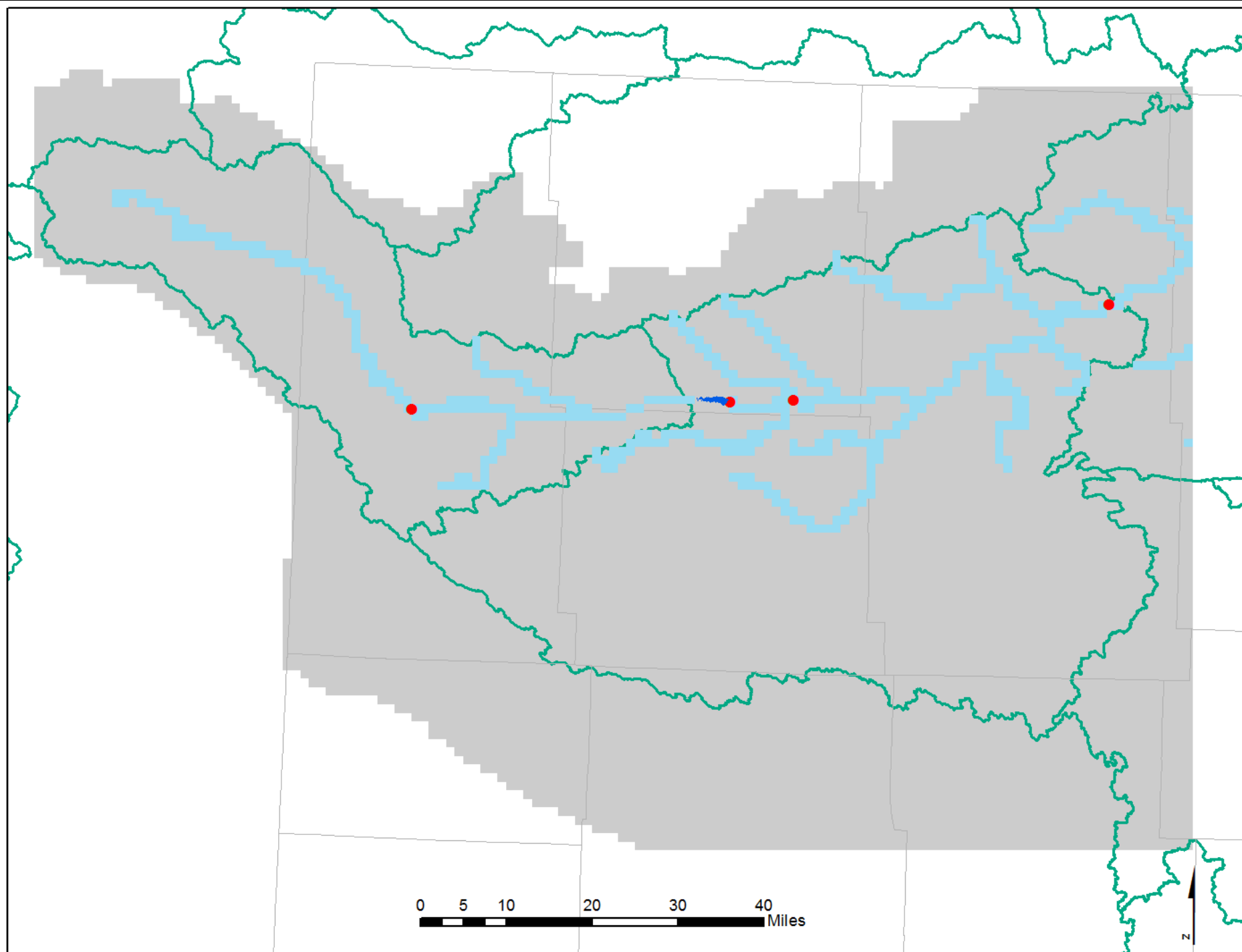
WaterSMART – Niobrara River Basin Study

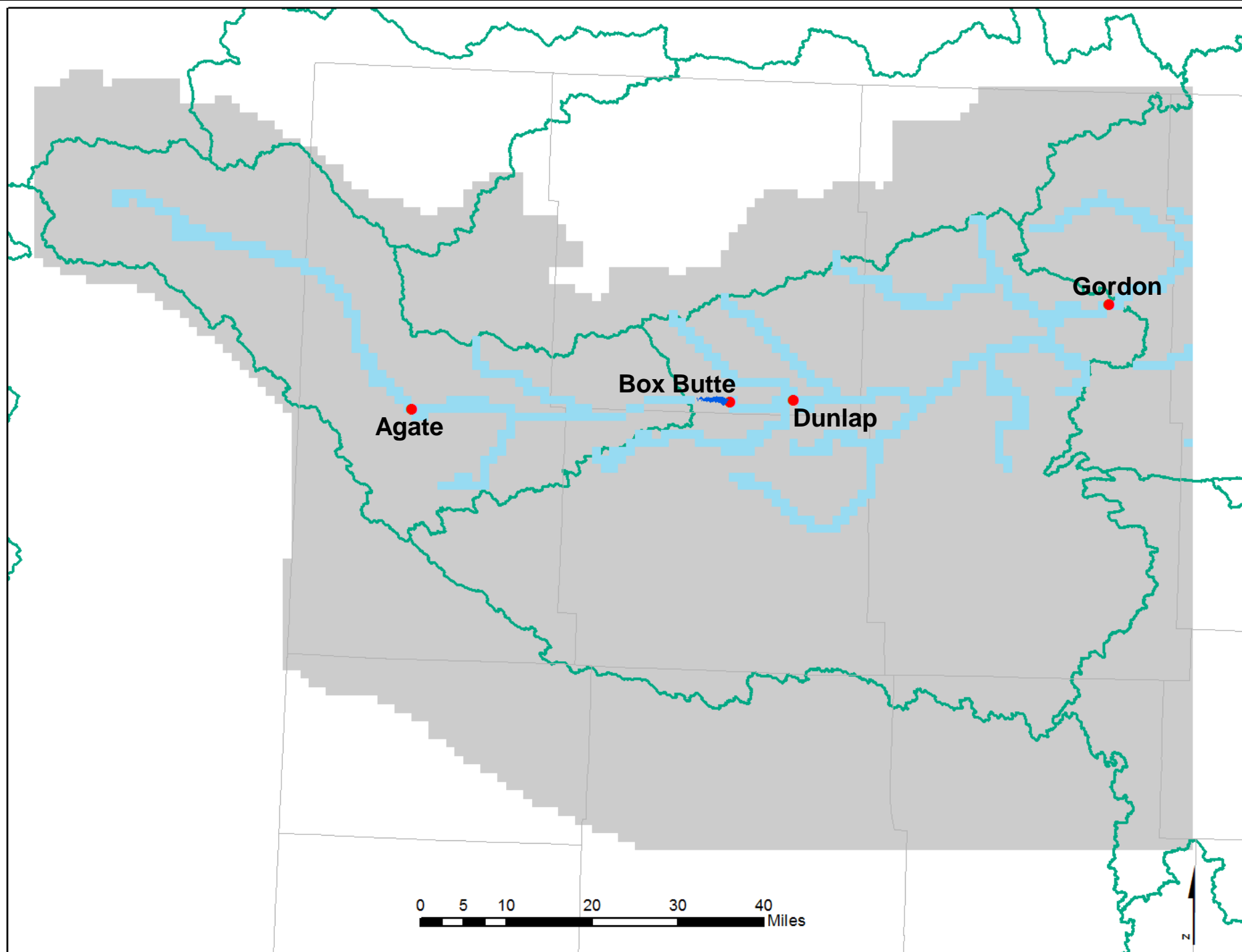
- UNW model and CENEB model used to assess the impact of different conditions
- Help to define options for meeting future demands
- Under terms of the WaterSMART grant received from the Bureau of Reclamation in 2010, certain conditions must be evaluated:
 - ✓ Impact of climate change
 - ✓ Impact of alternative management scenarios



WaterSMART Scenario Results

- Integrated model run – groundwater, watershed, and surface water operations model
- Groundwater model preliminary results
- Climate scenario
- Alternative scenarios
- Baseflow and water level draw down

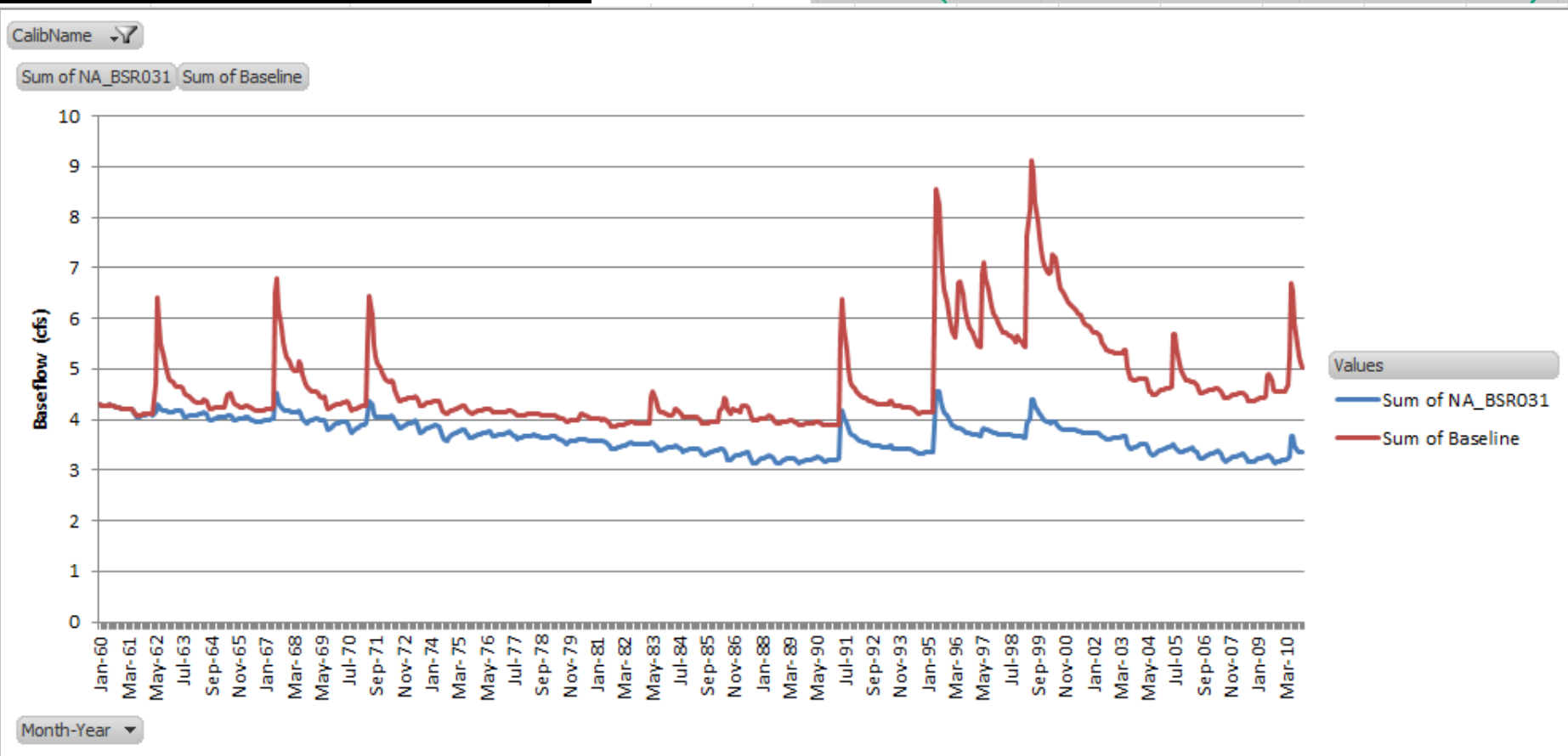
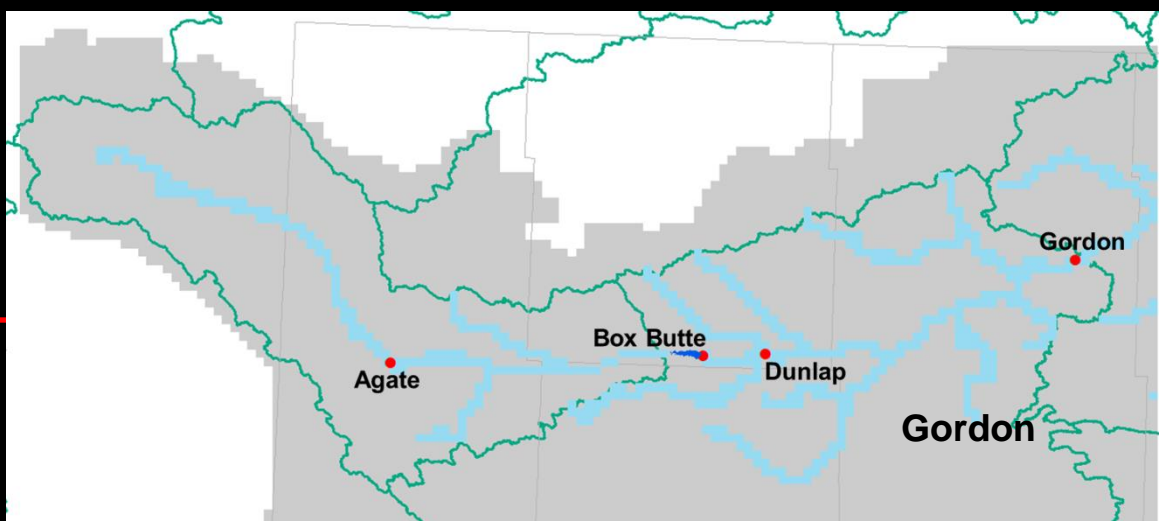




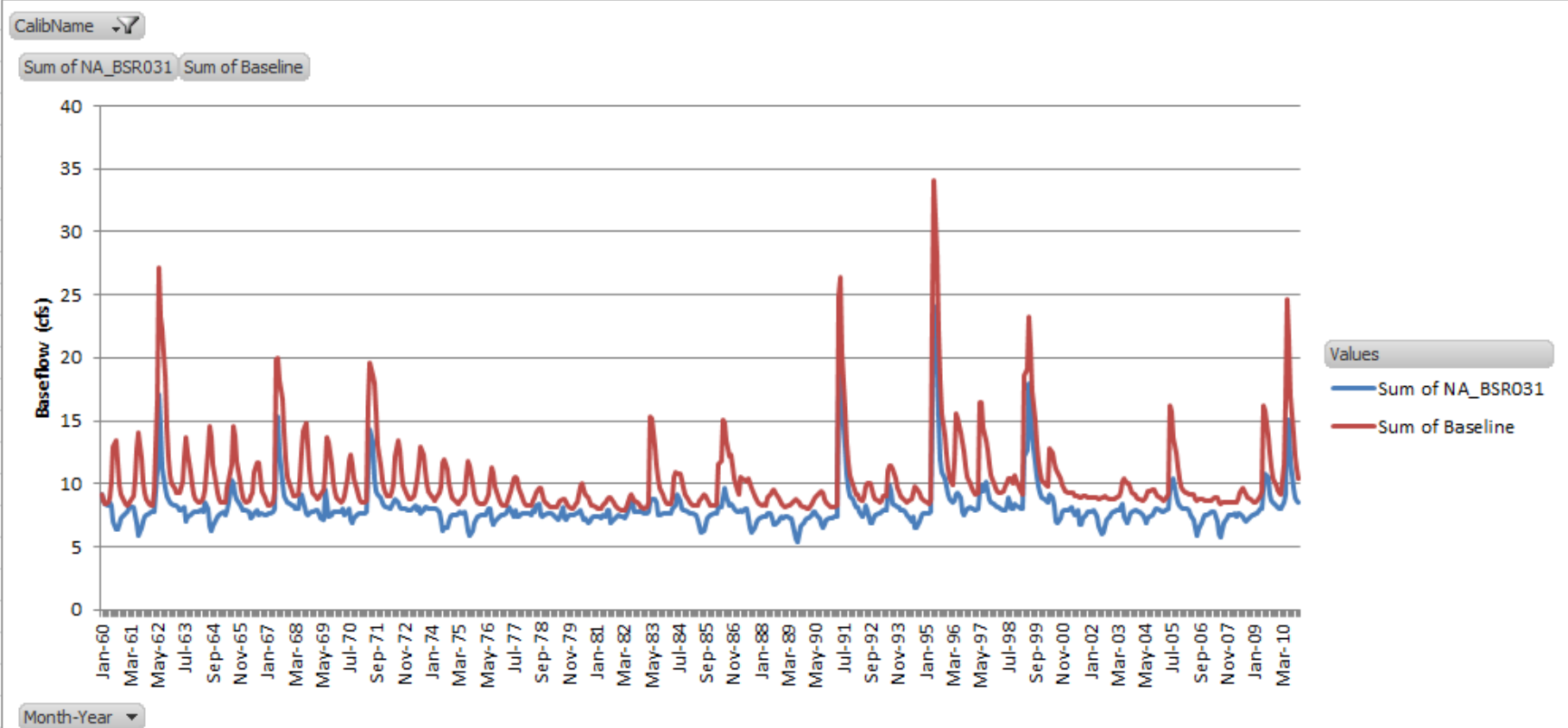
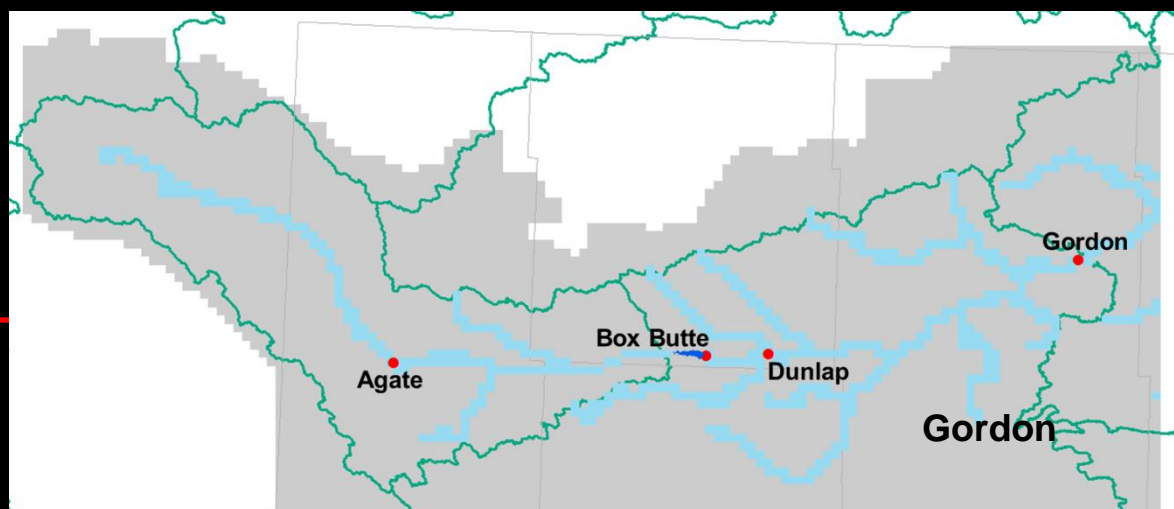
WaterSMART Scenario Results

- Current calibrated model run and baseline run

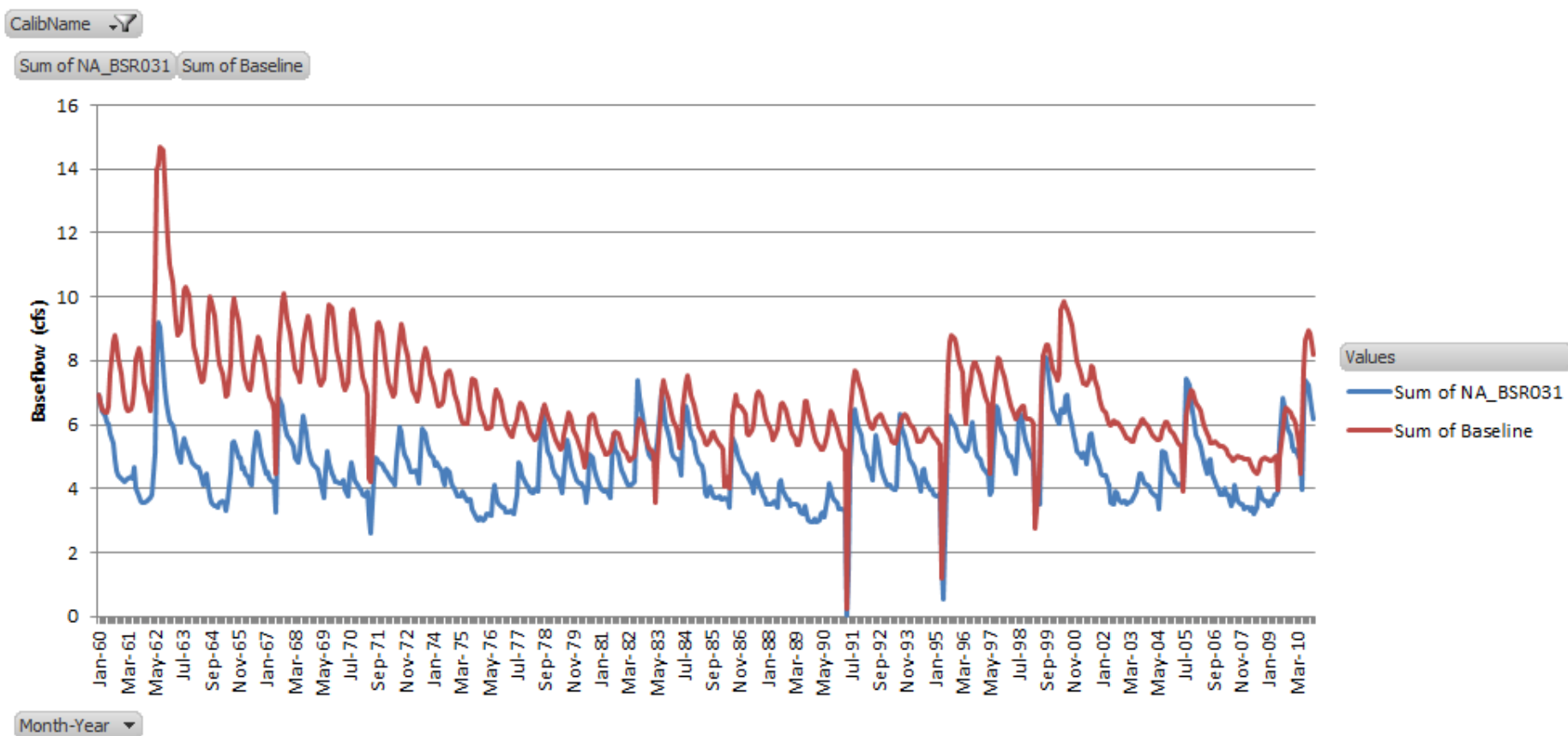
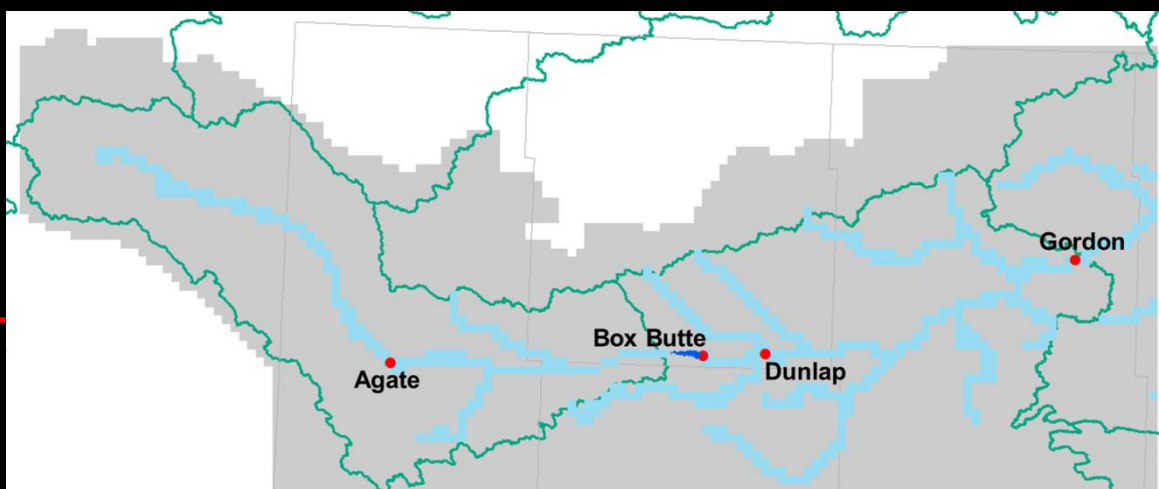
WY to Stateline



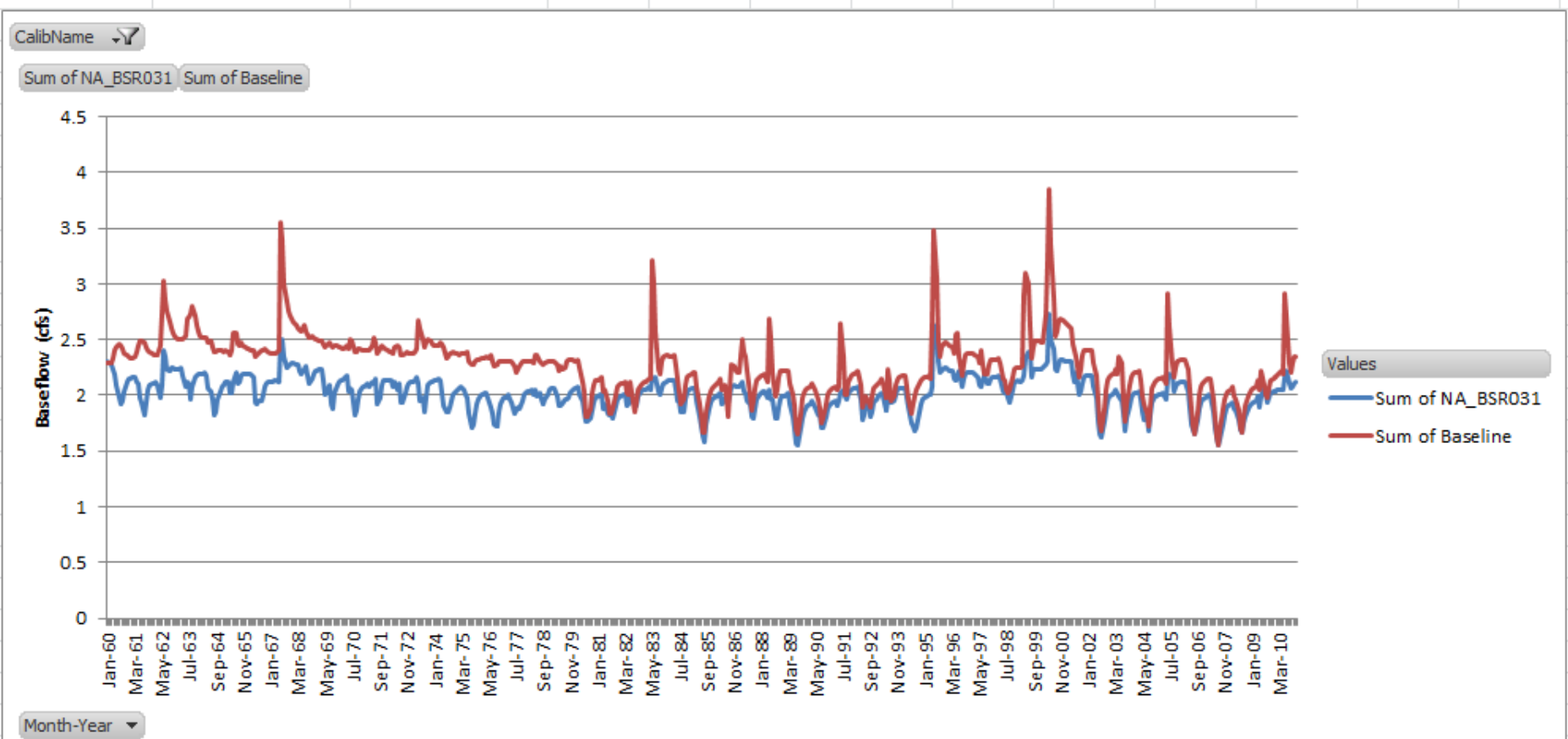
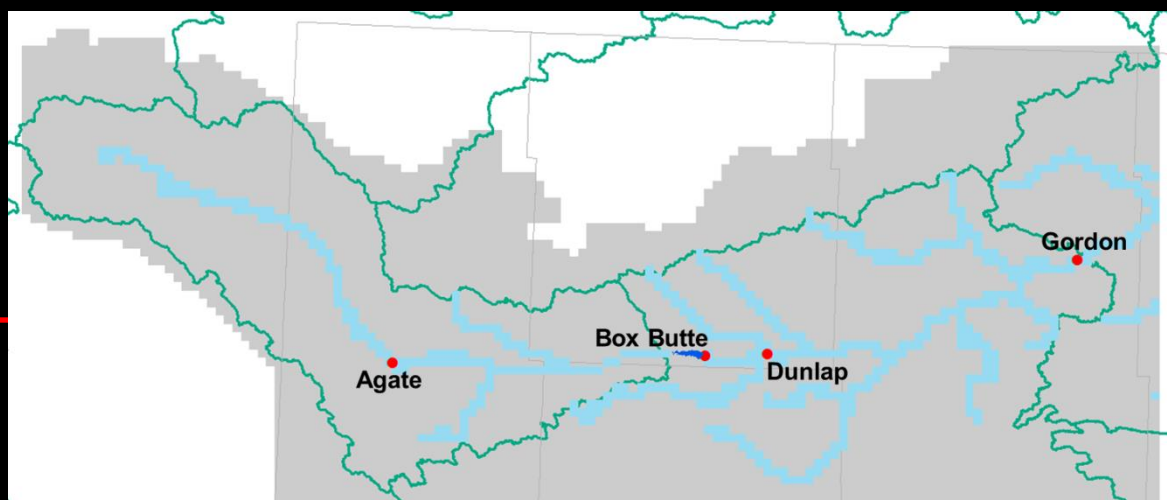
Stateline to Agate



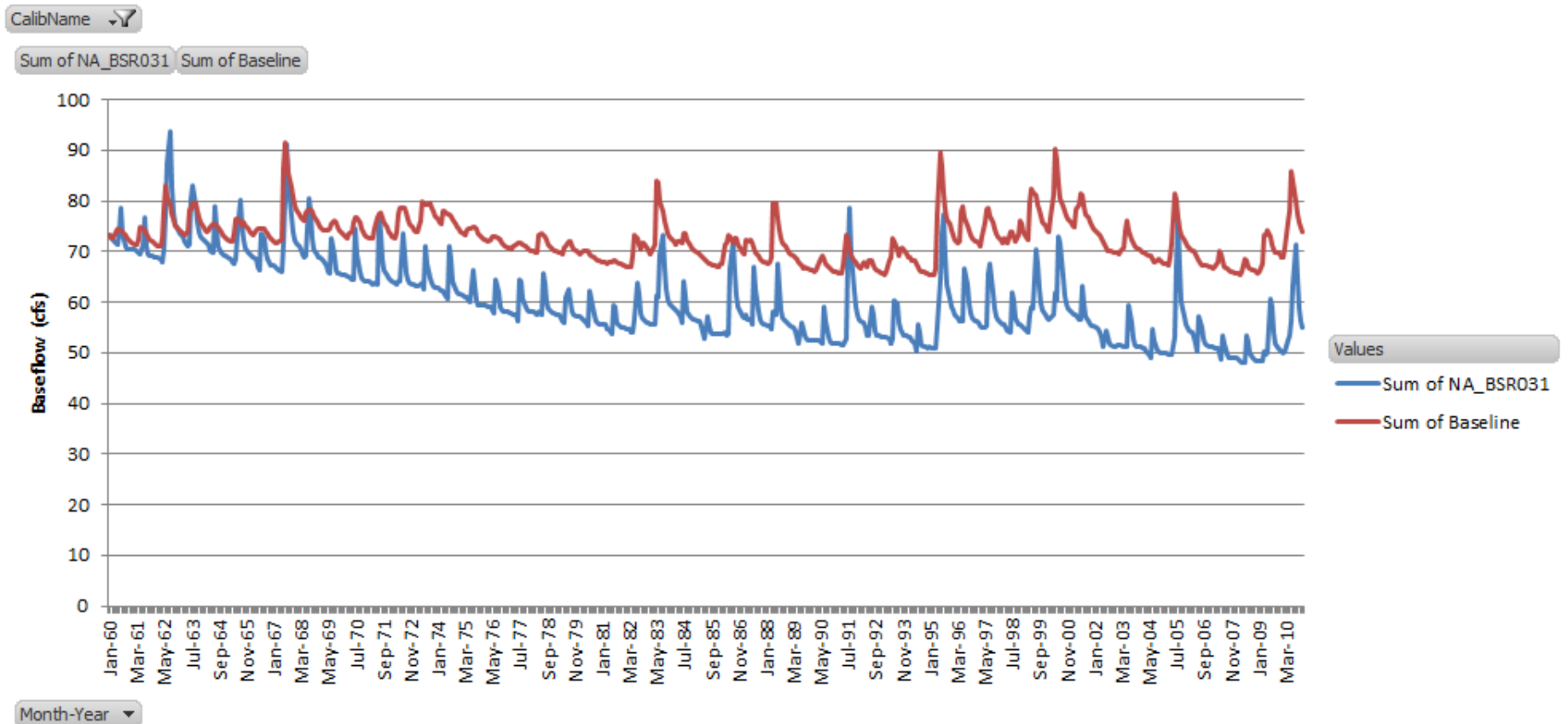
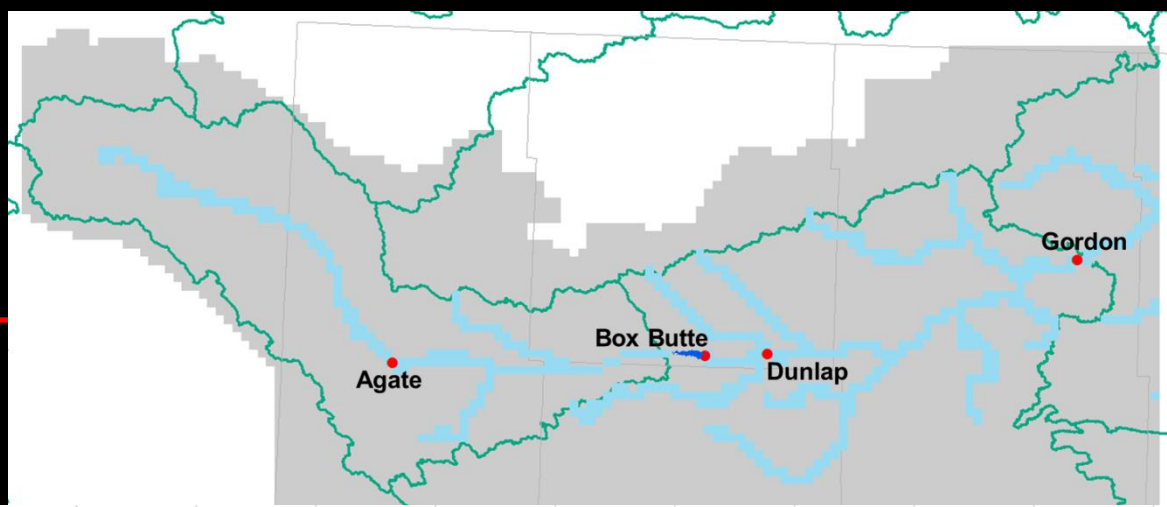
Agate to Box Butte



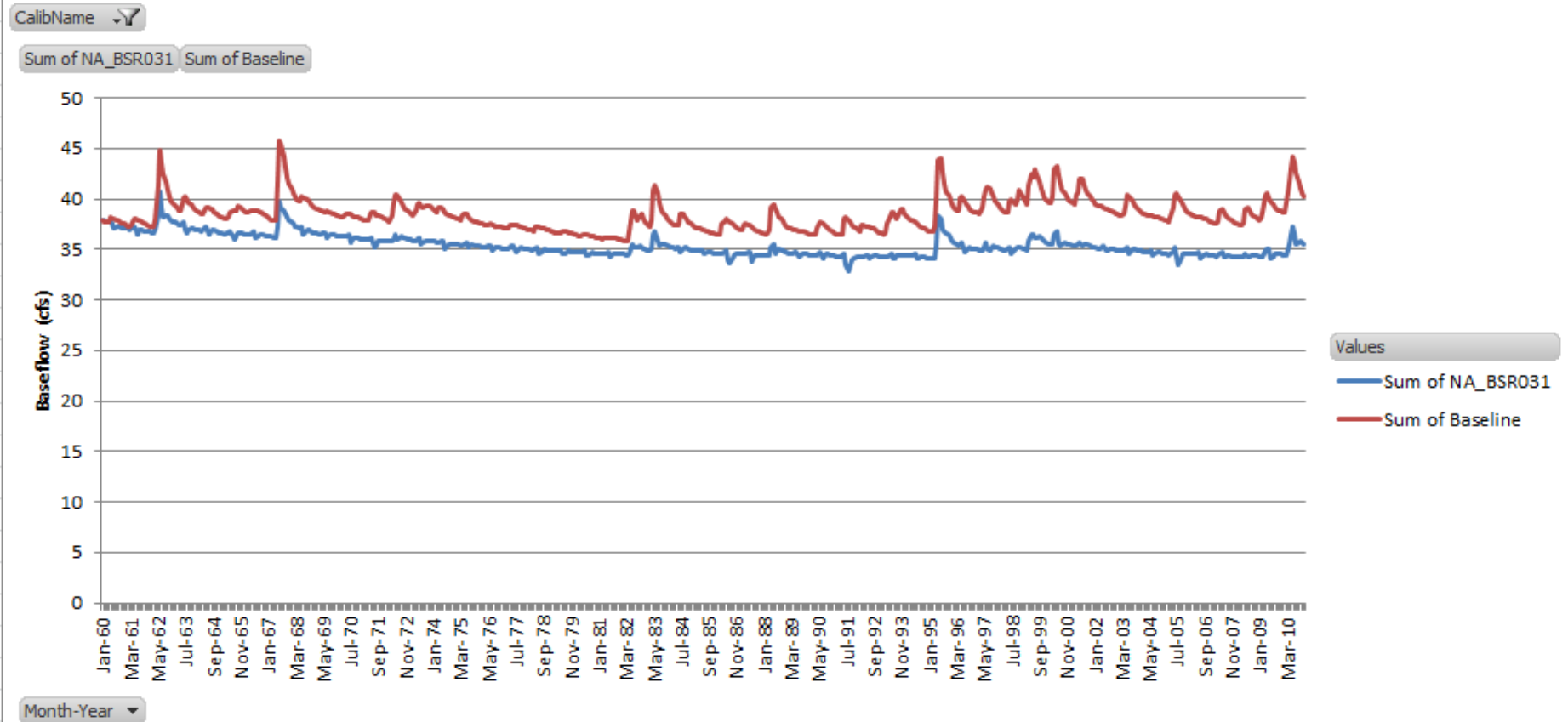
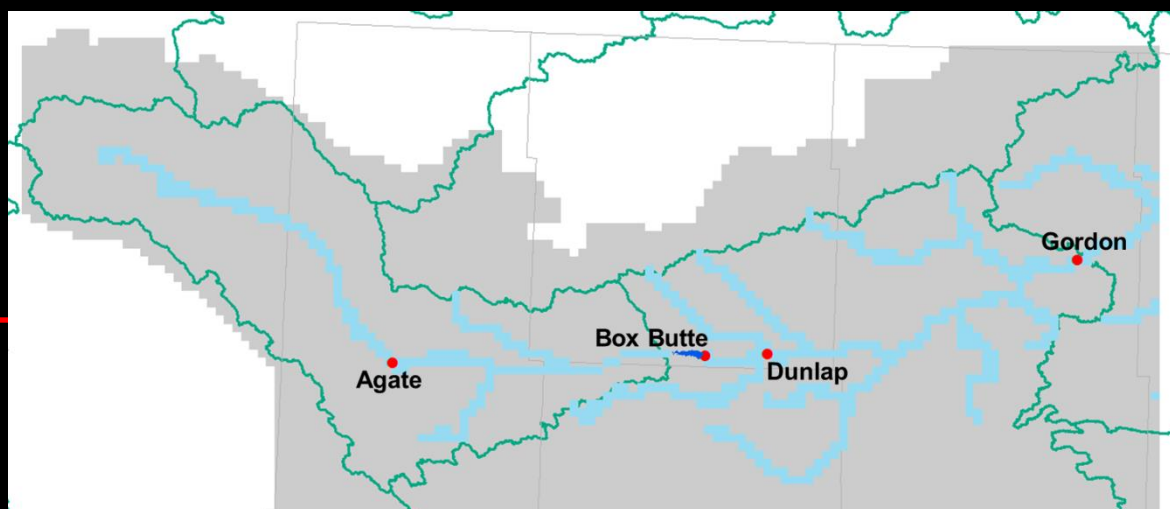
Box Butte to Dunlap



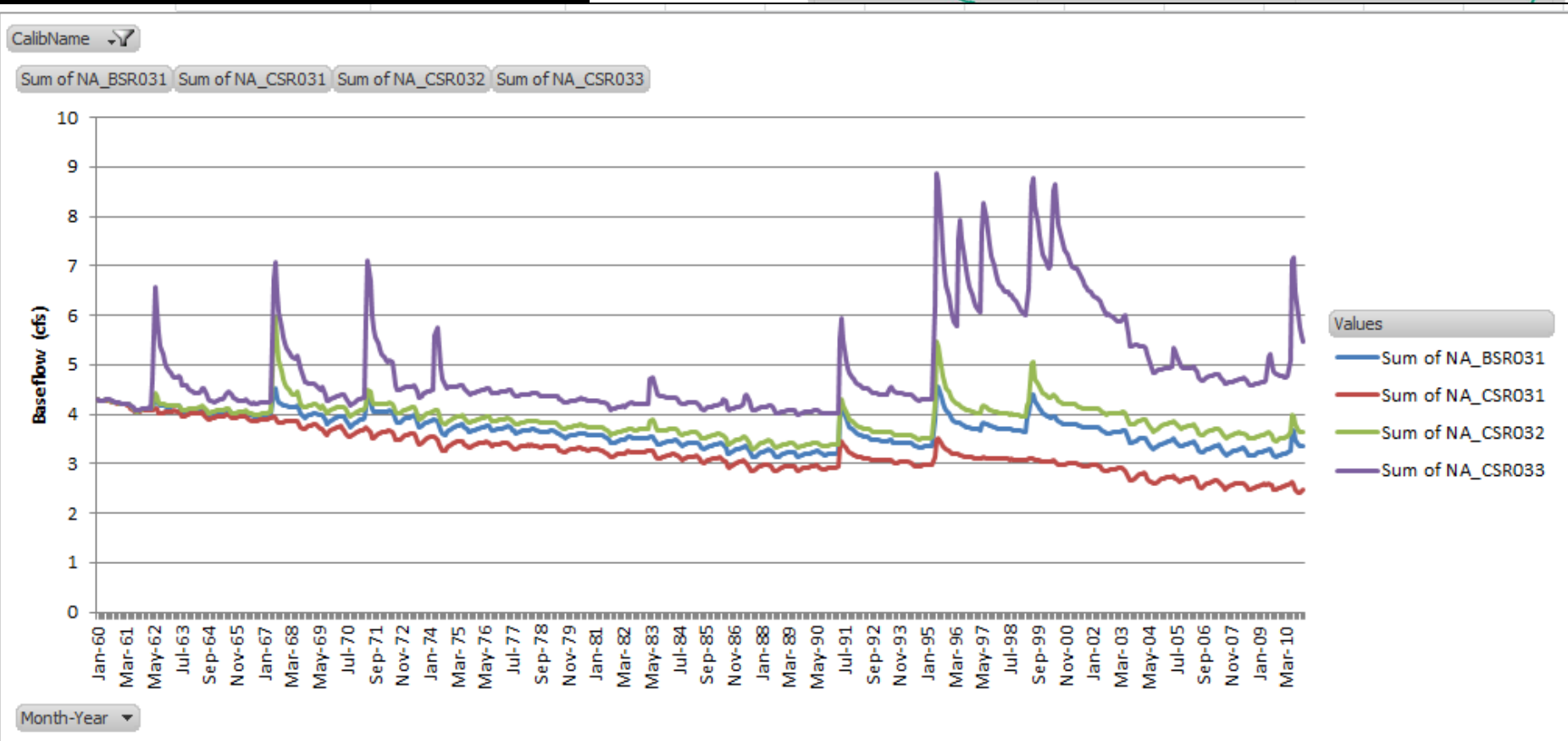
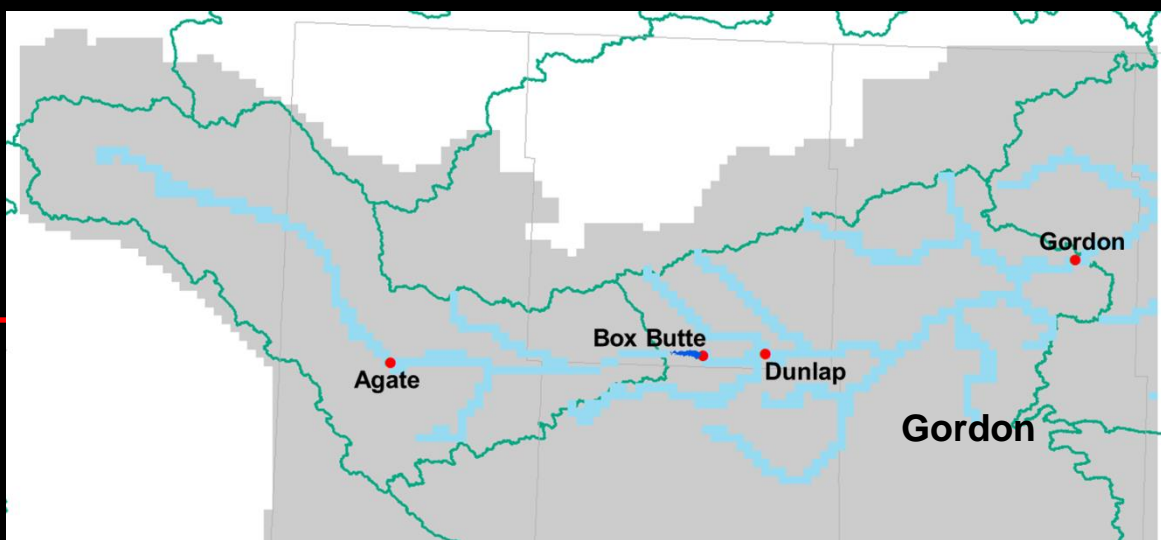
Dunlap to Gordon



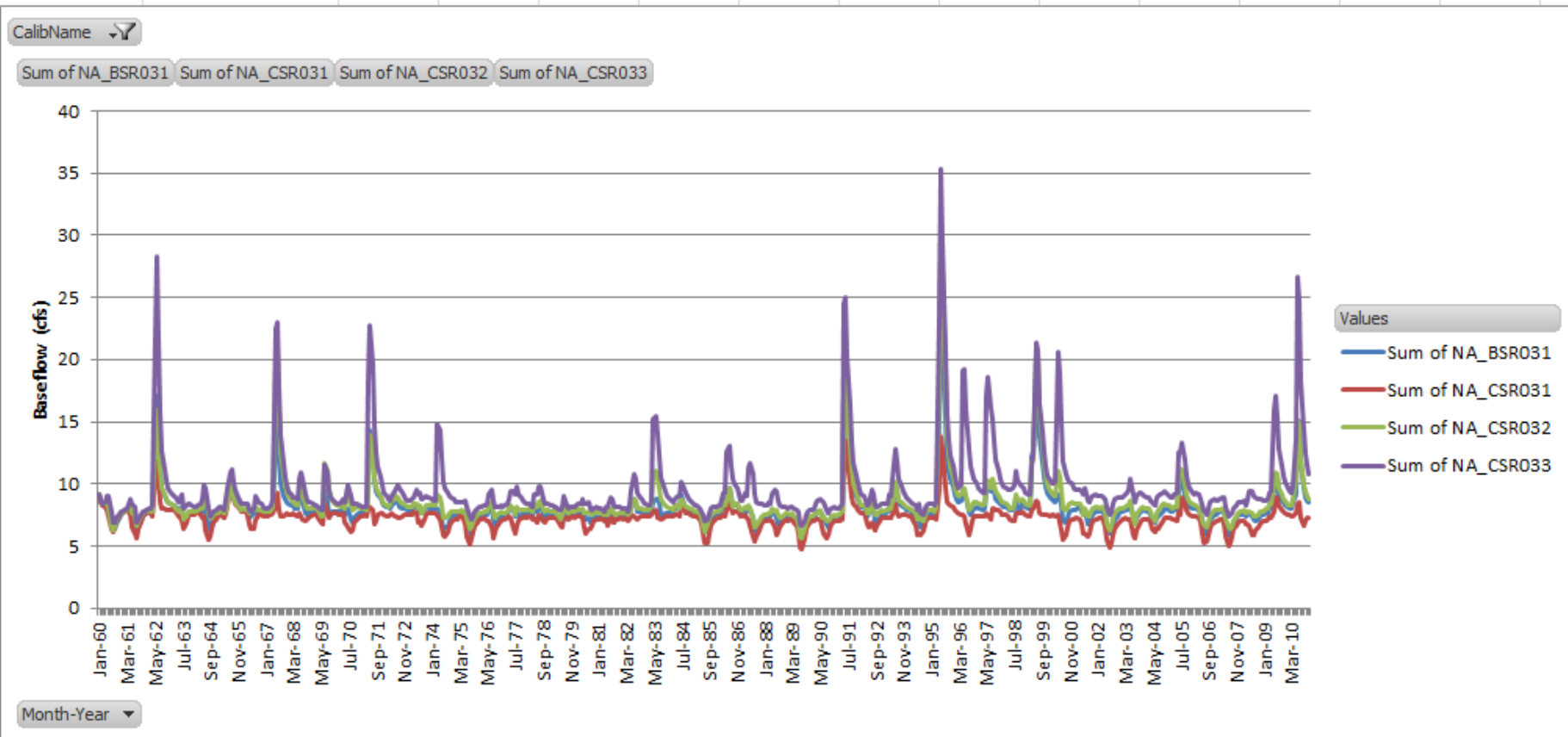
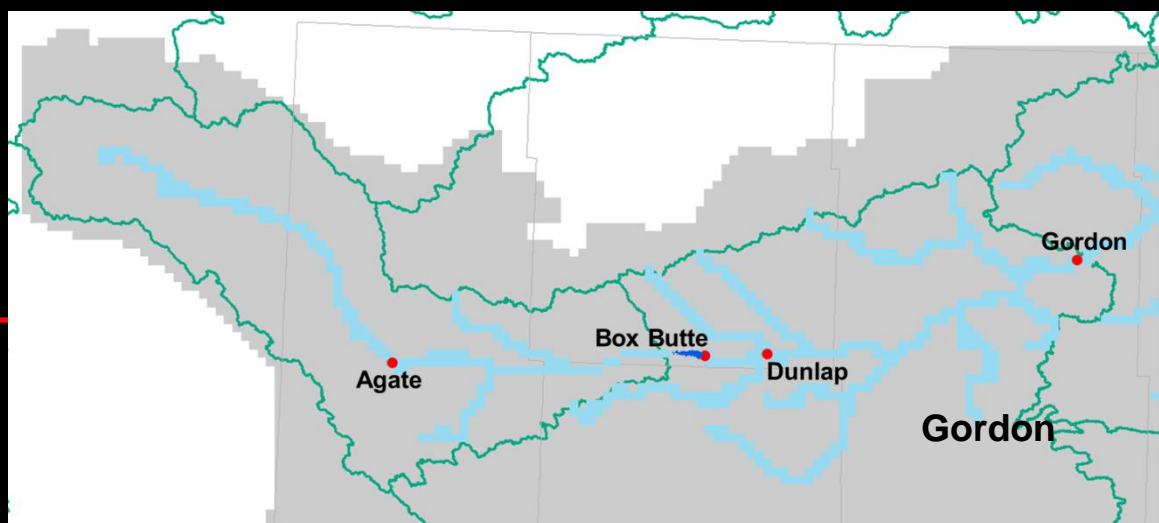
Gordon to Edge



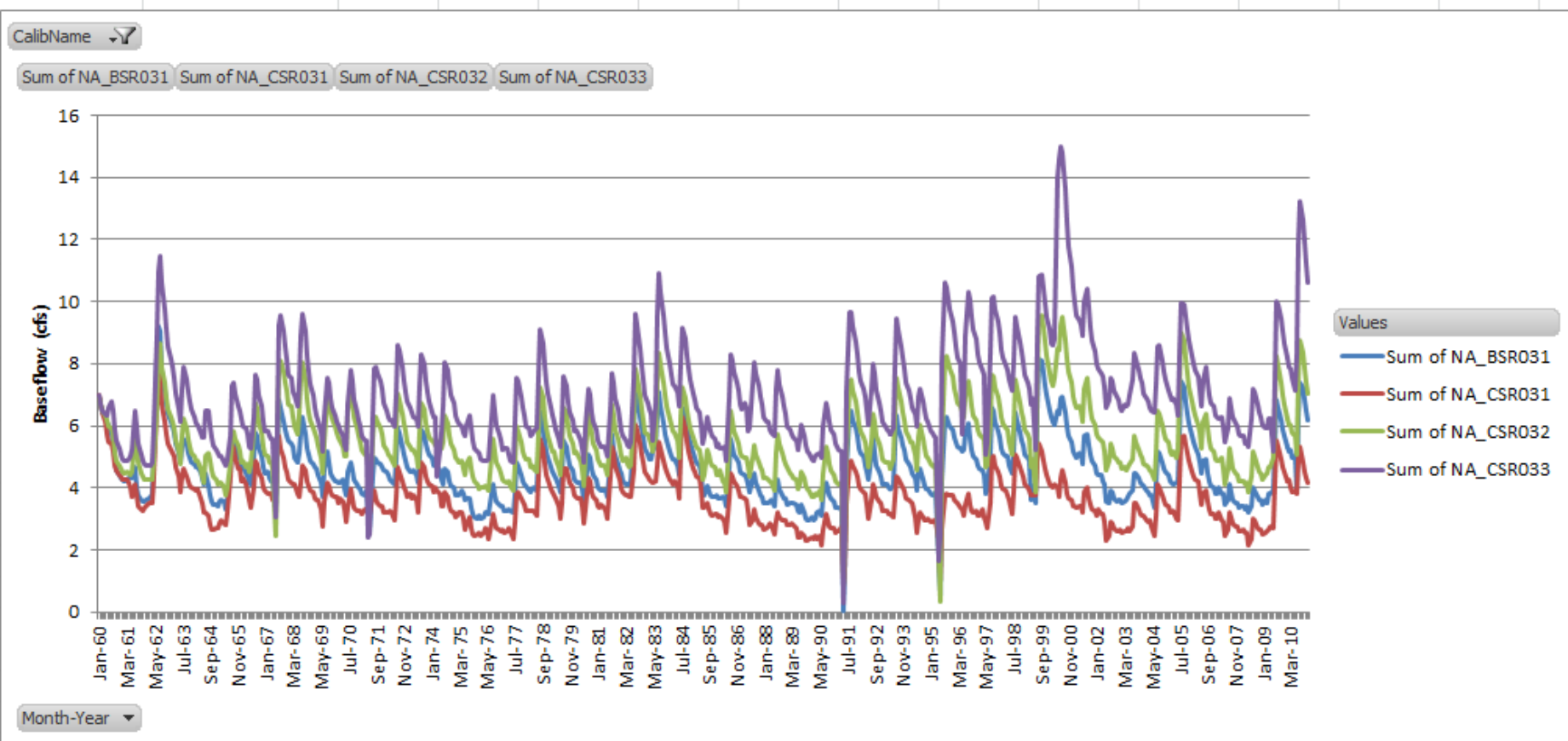
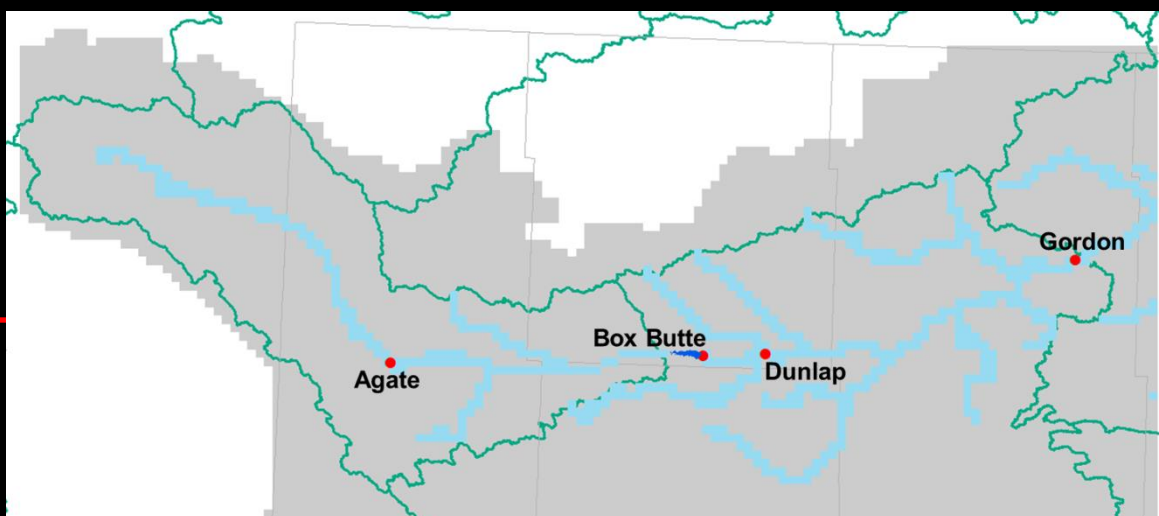
WY to Stateline



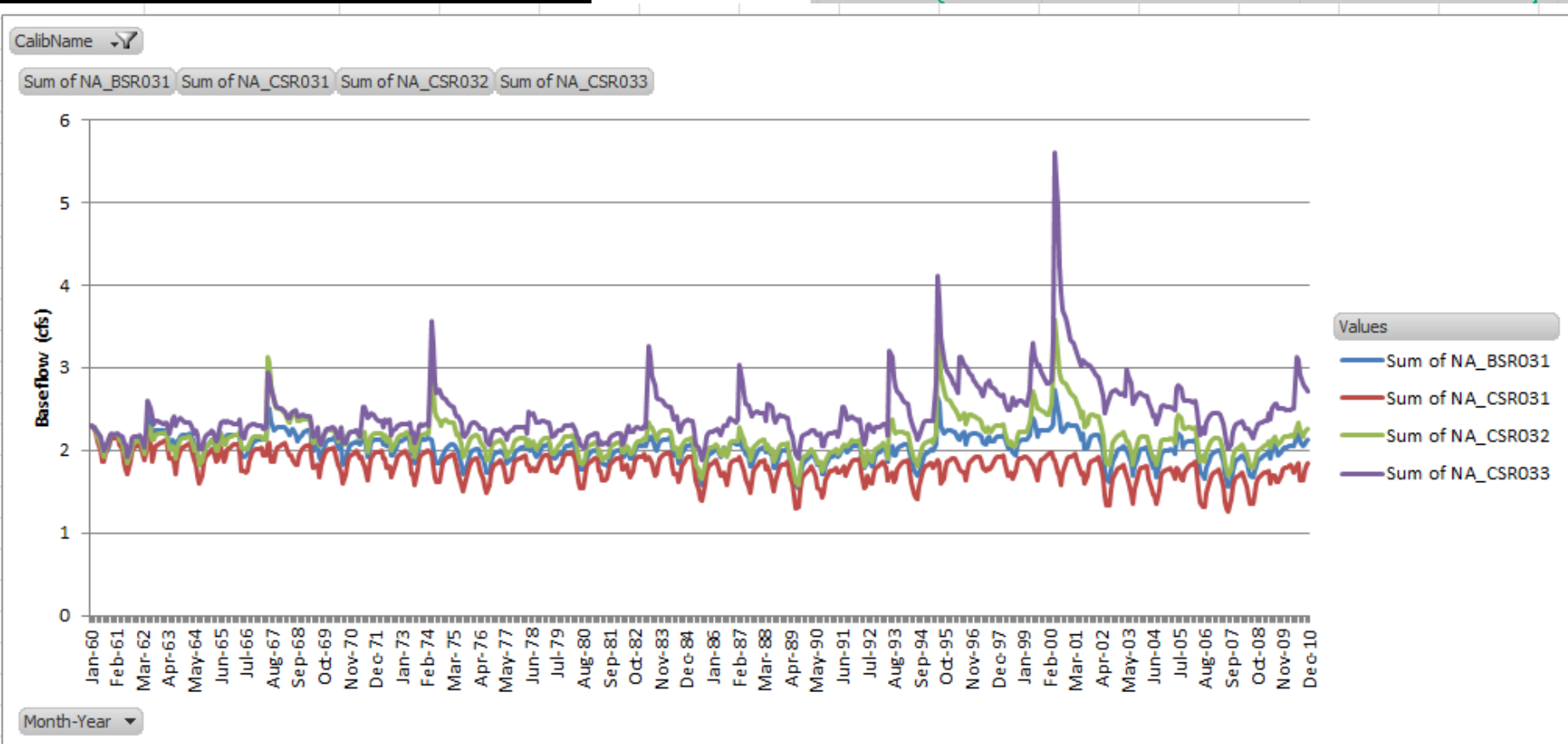
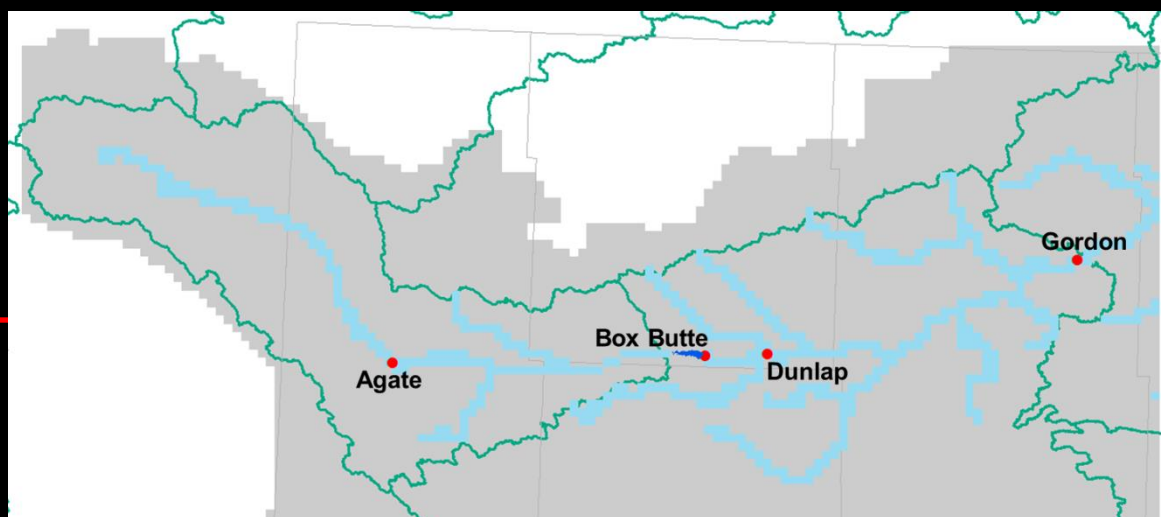
Stateline to Agate



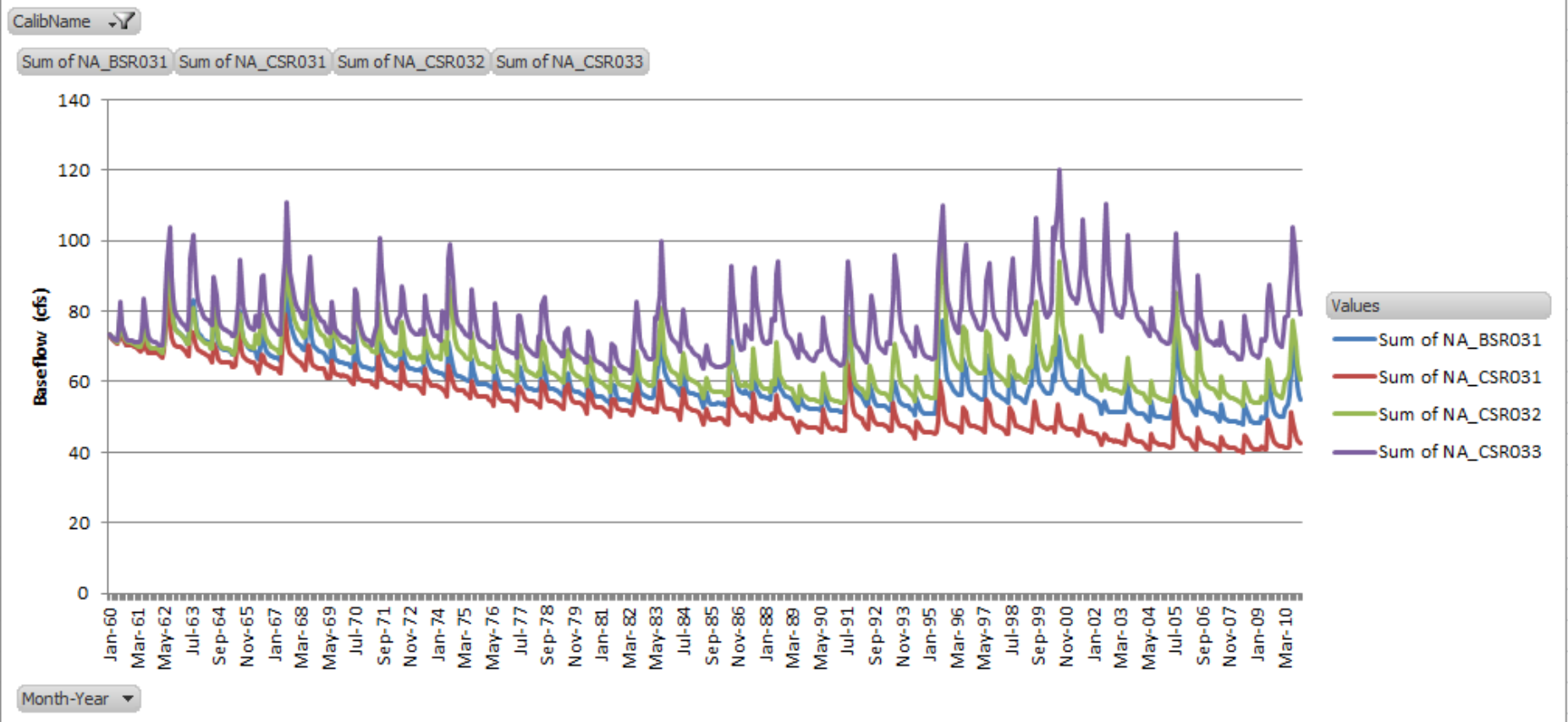
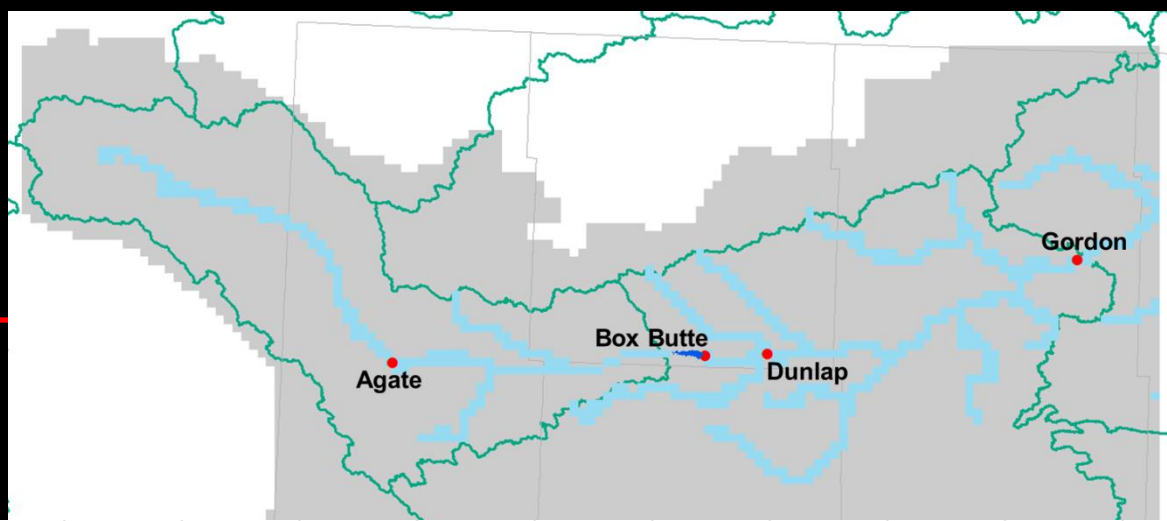
Agate to Box Butte



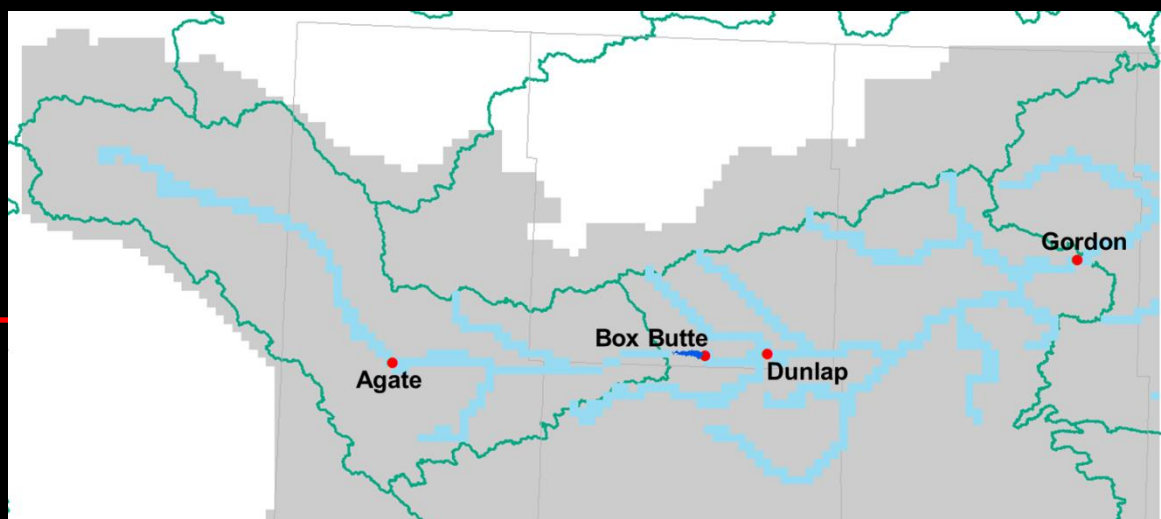
Box Butte to Dunlap



Dunlap to Gordon

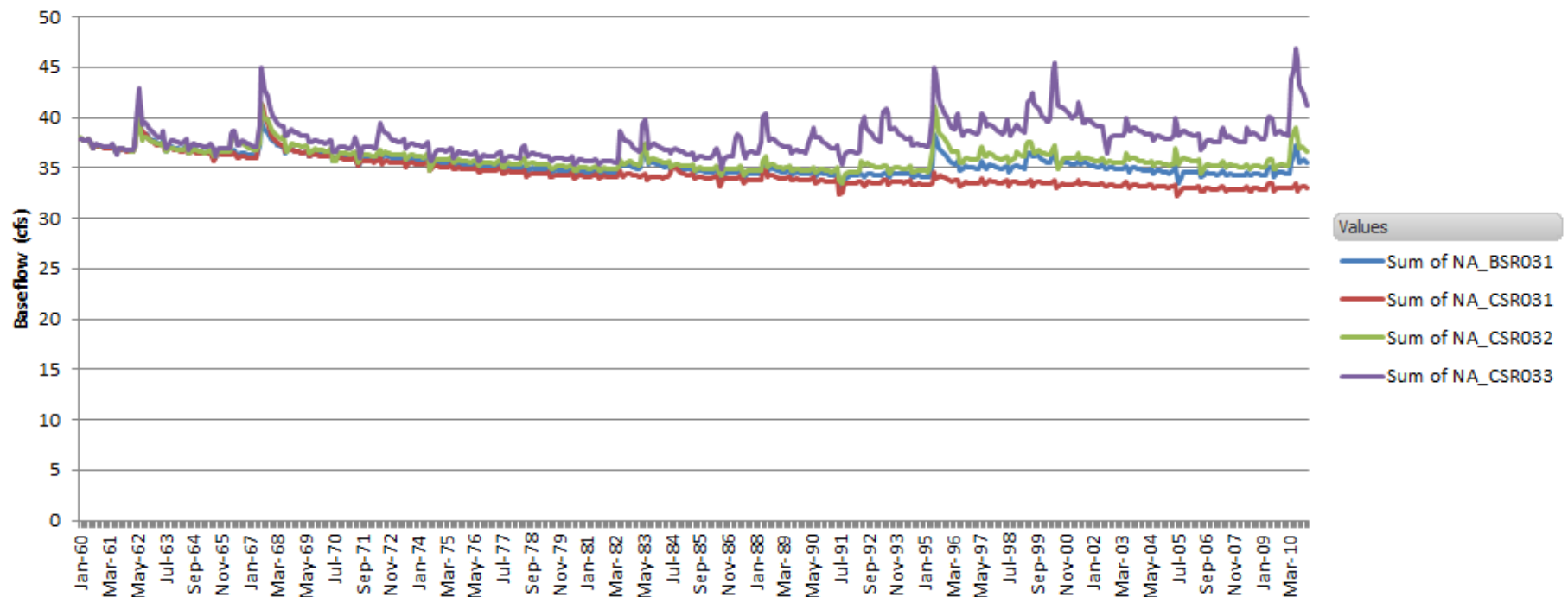


Gordon to Edge



CalibName

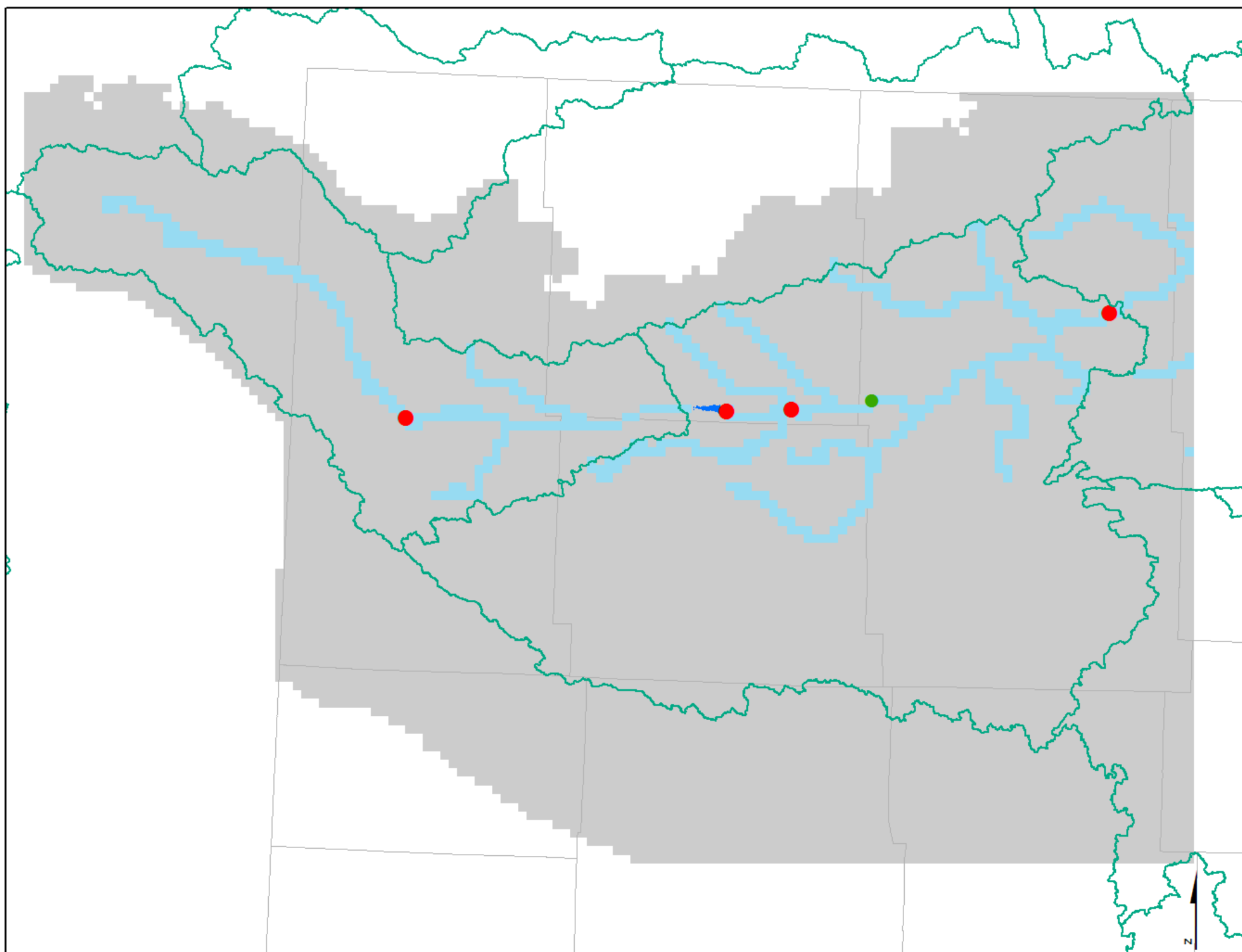
Sum of NA_BSR031 Sum of NA_CSR031 Sum of NA_CSR032 Sum of NA_CSR033



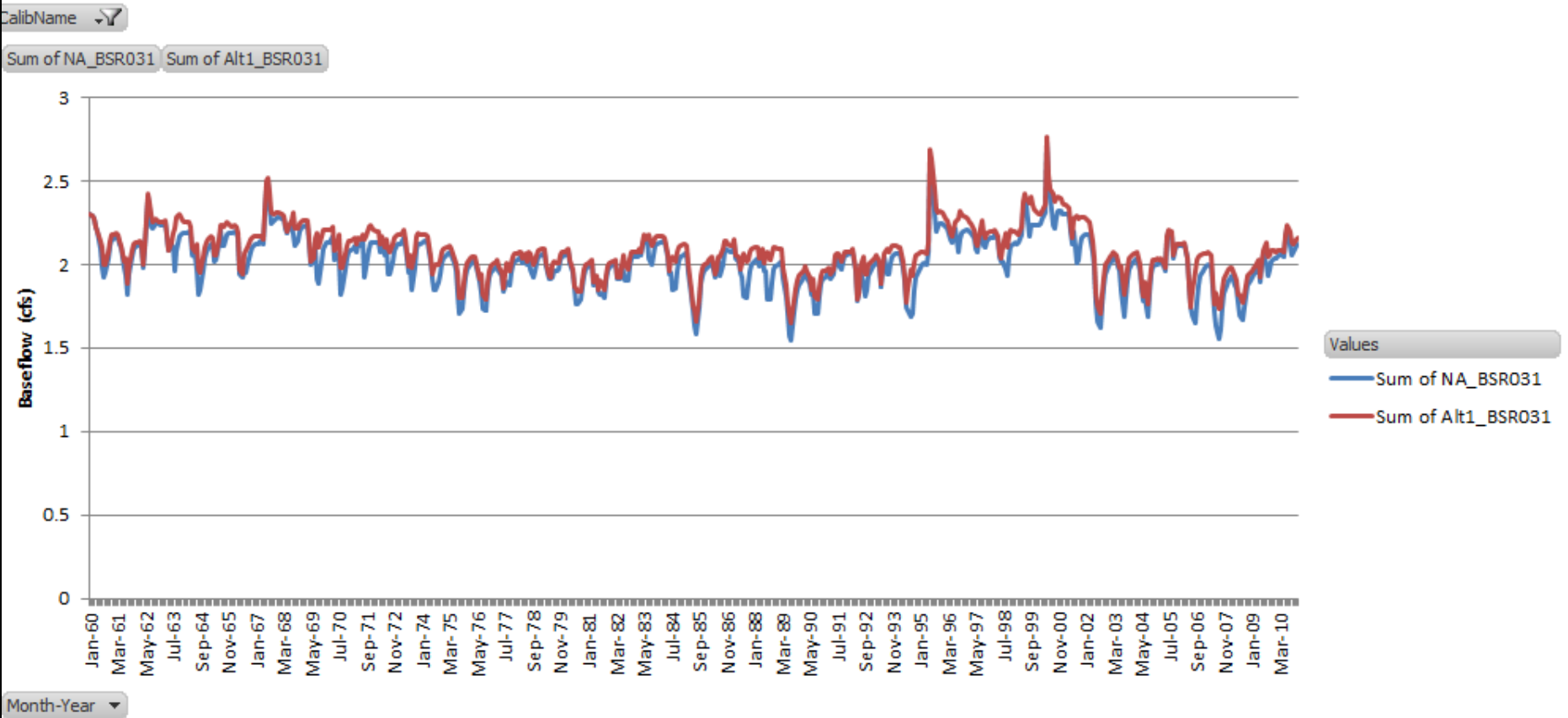
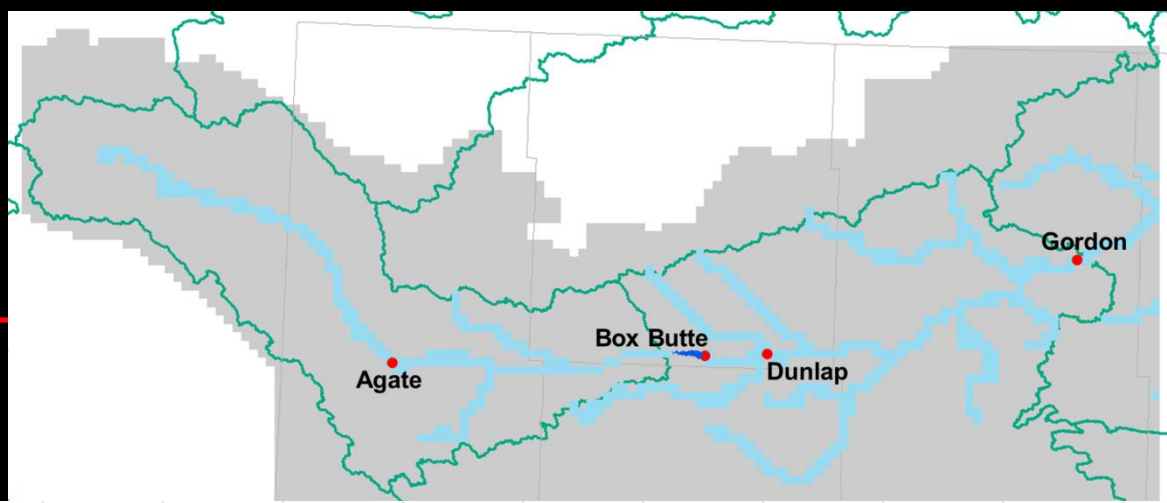
Month-Year

WaterSMART Scenario Results

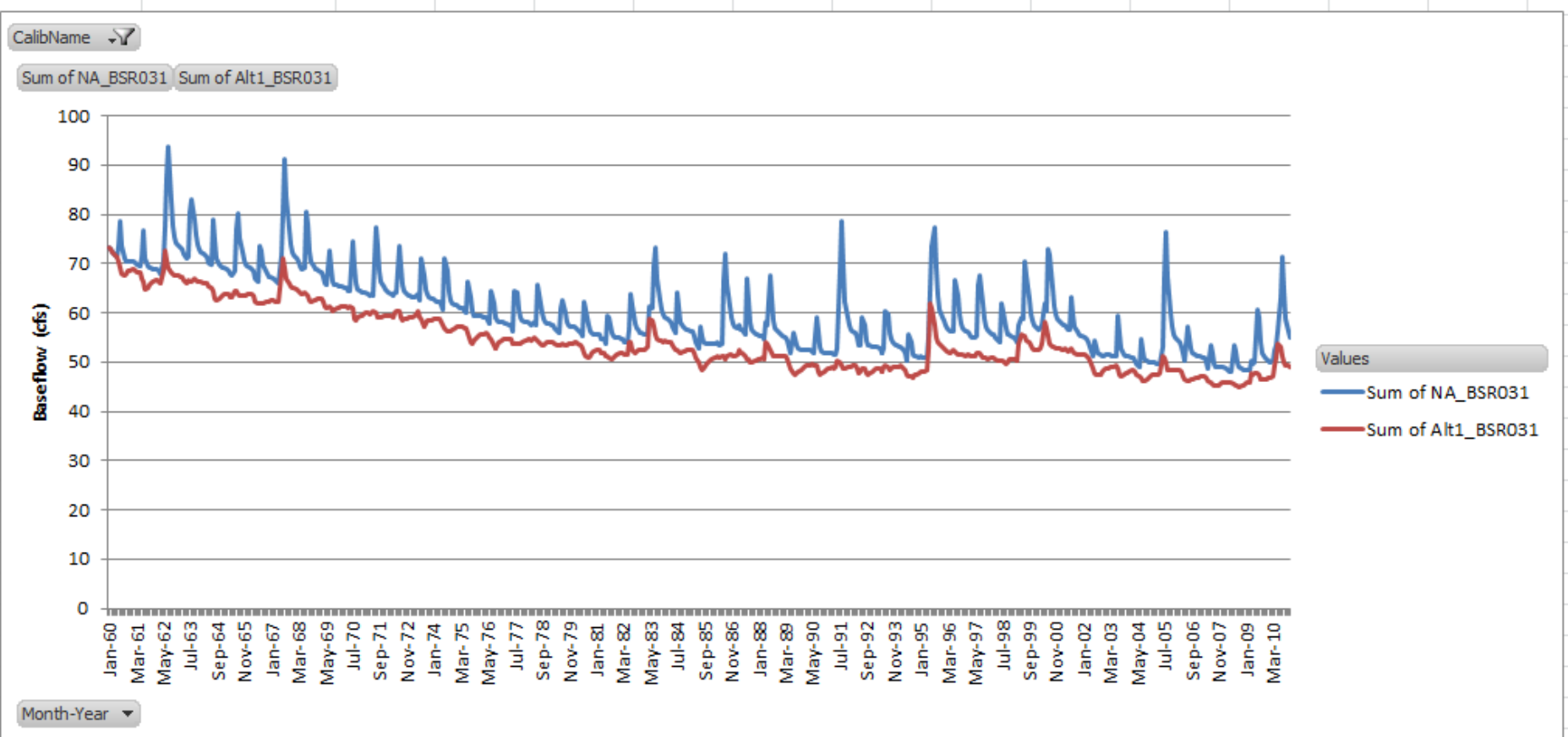
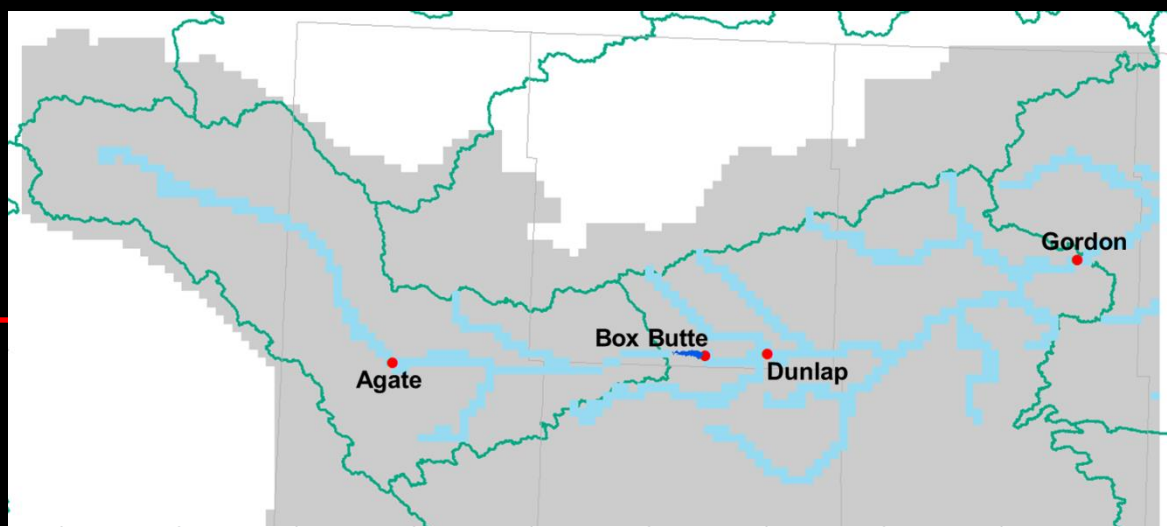
- Alternative 1 scenario – Pumping station



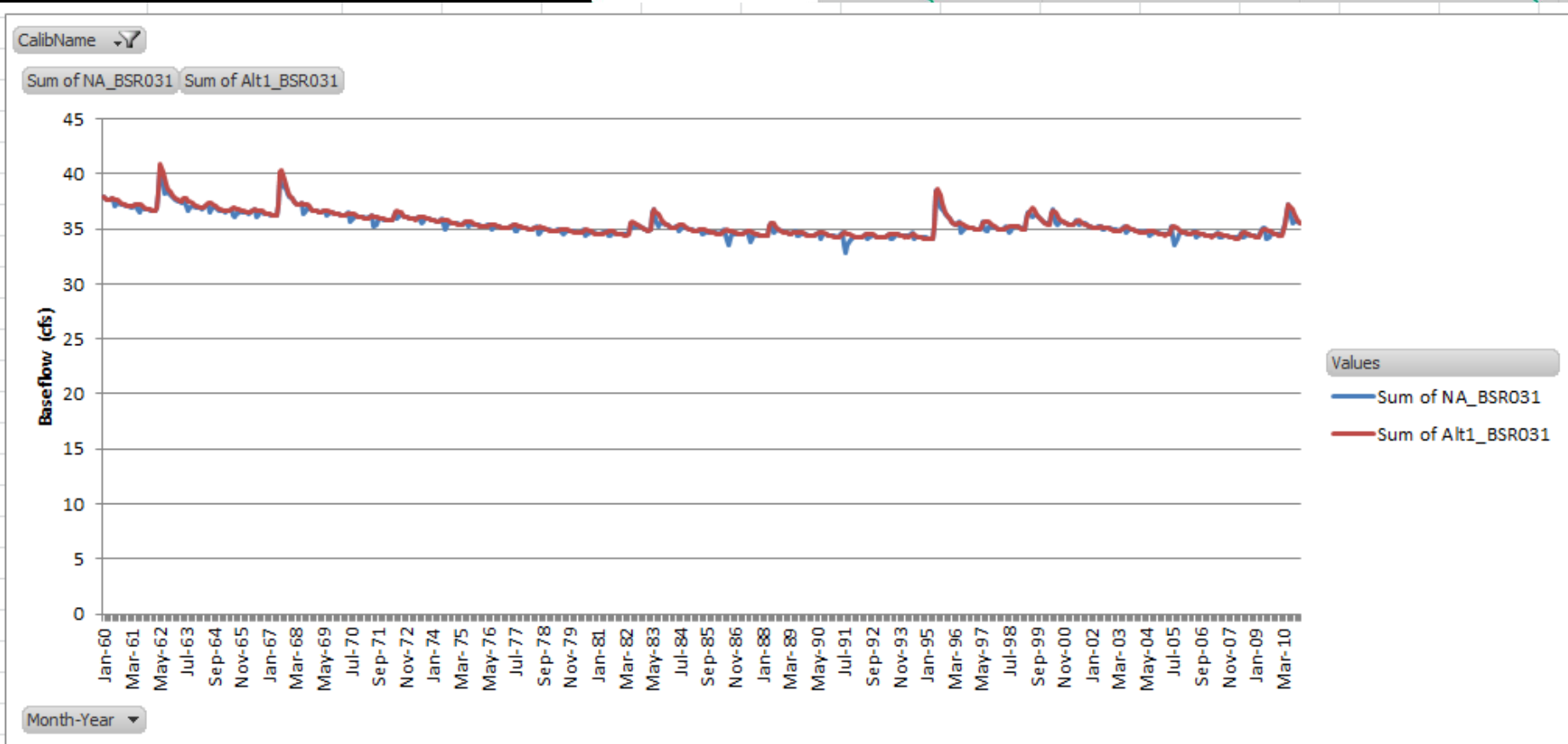
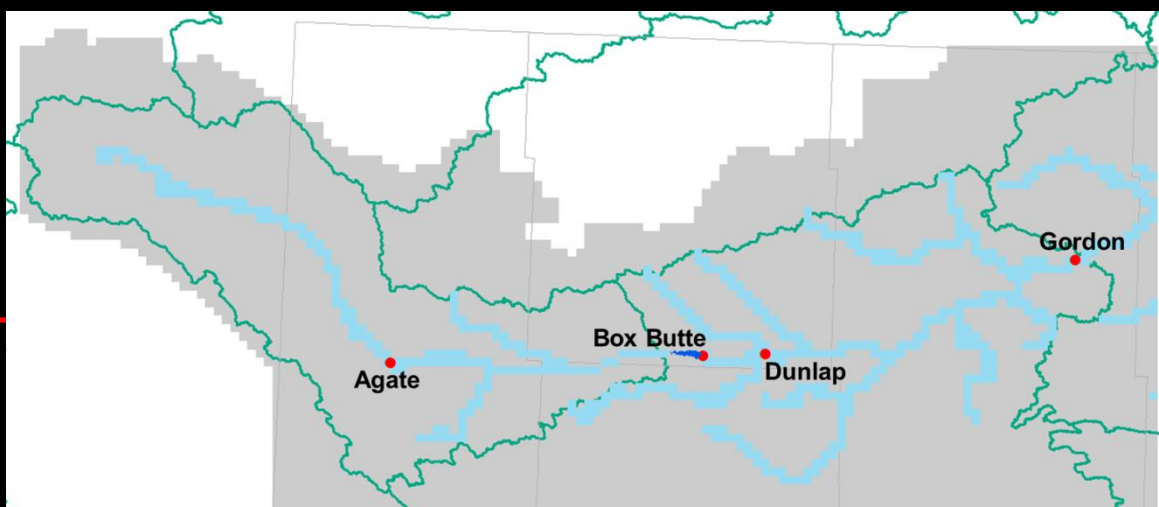
Box Butte to Donlap



Dunlap to Gordon

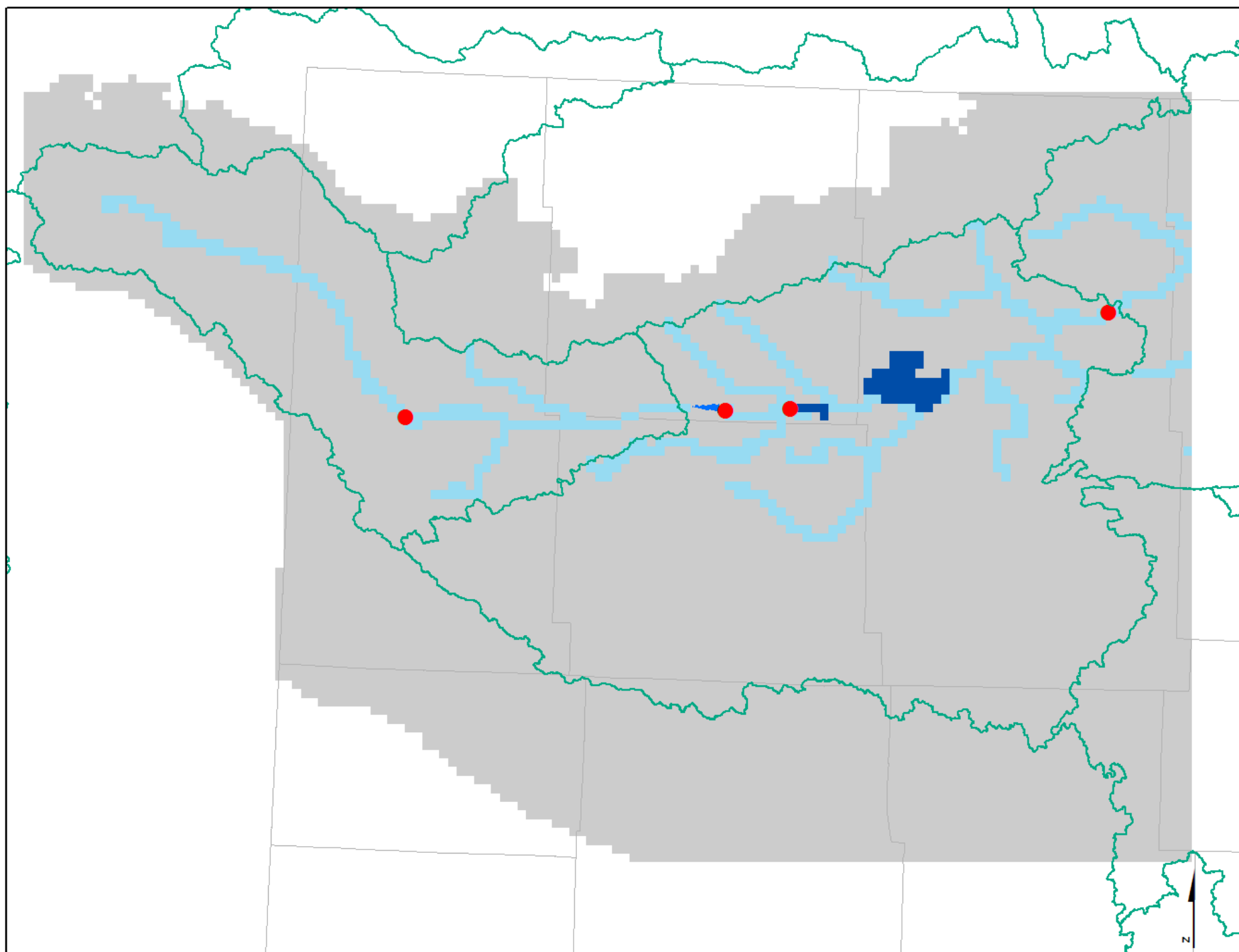


Gordon to Edge

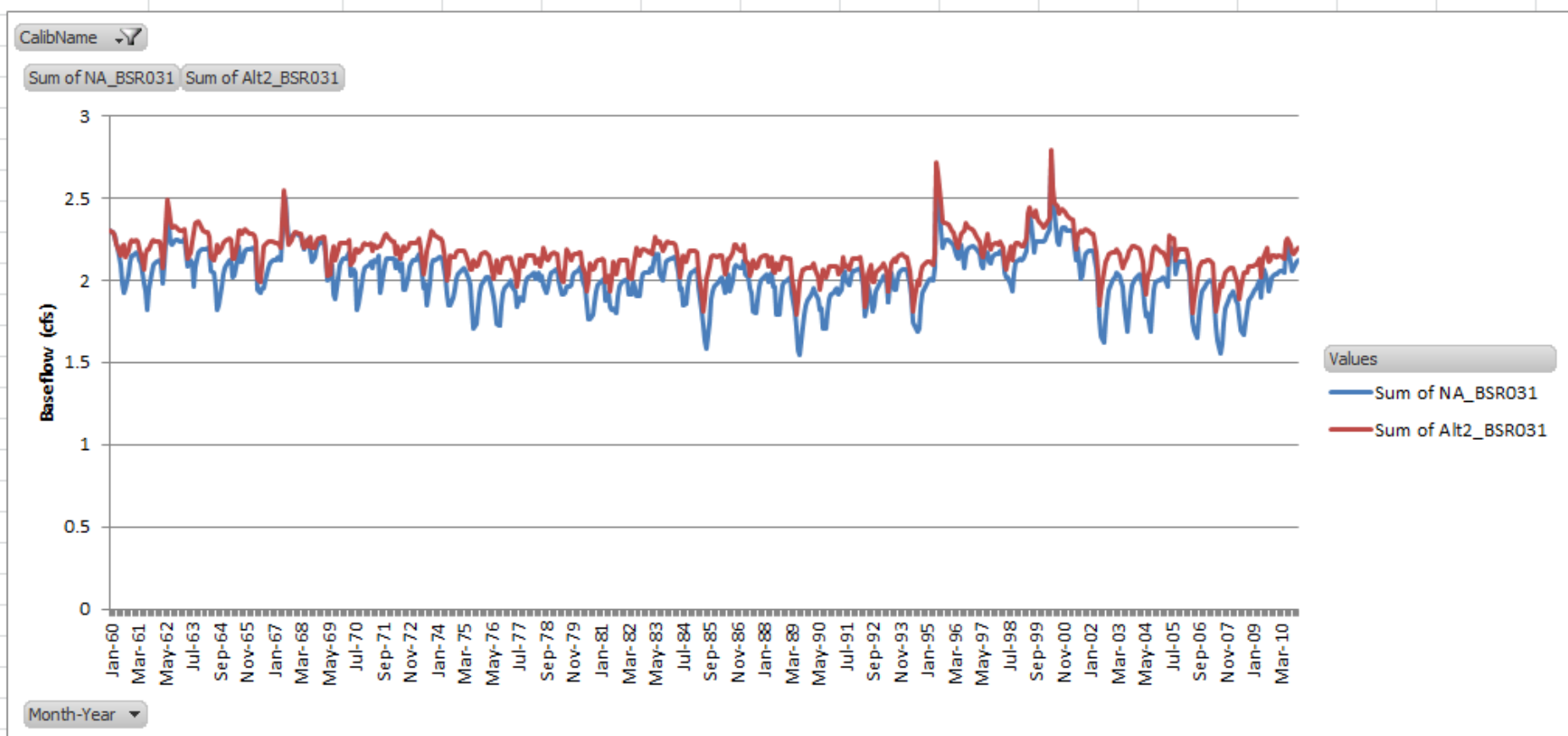
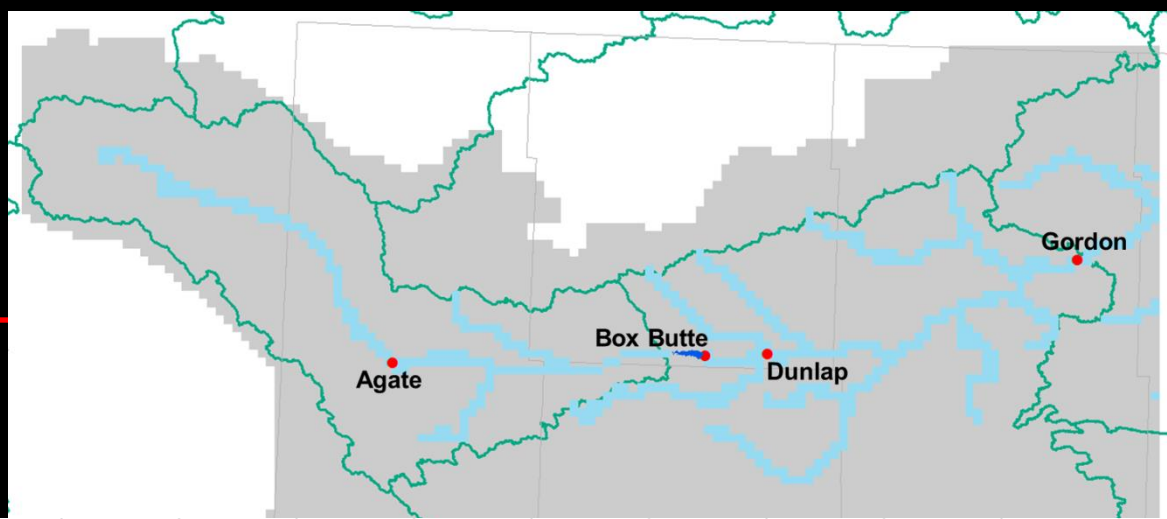


WaterSMART Scenario Results

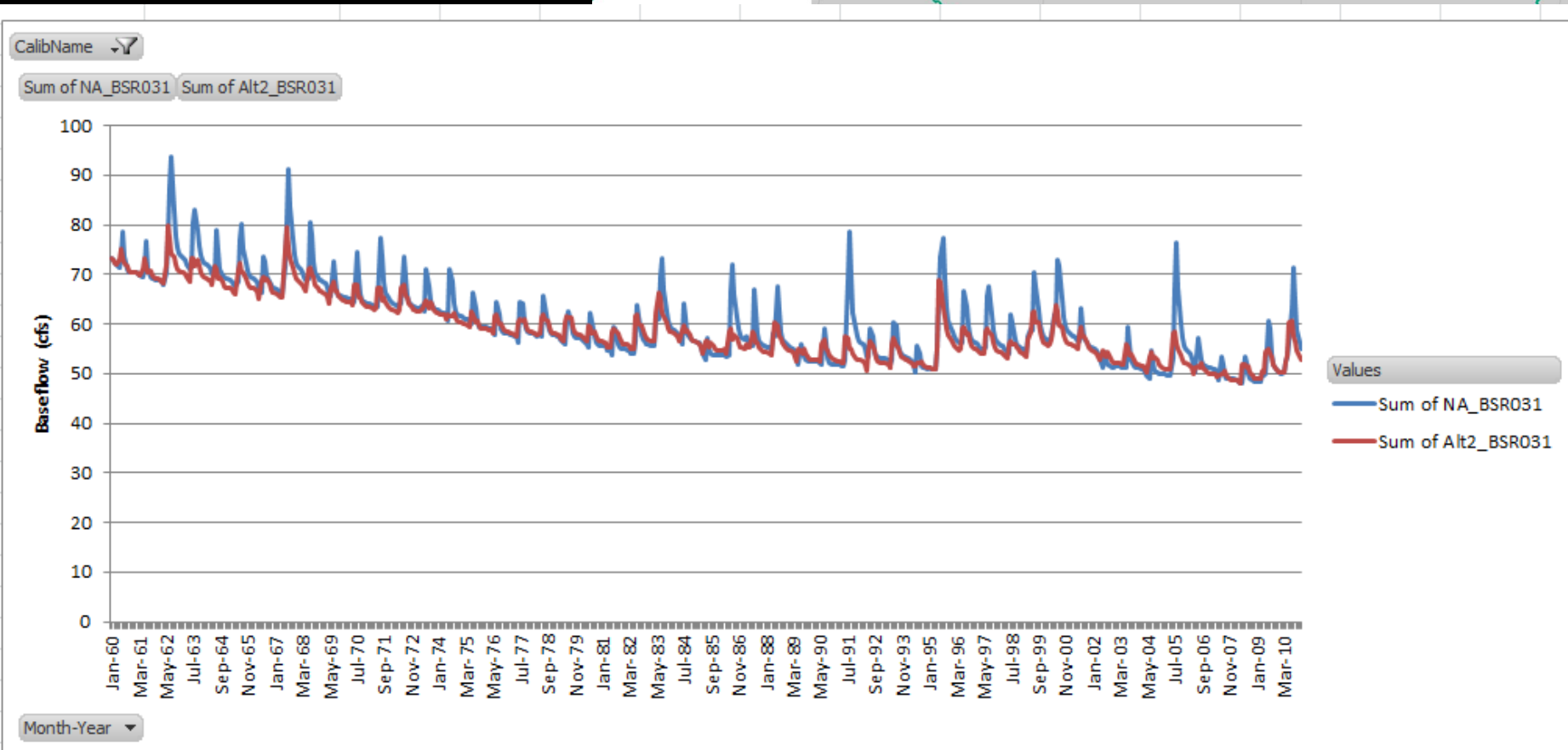
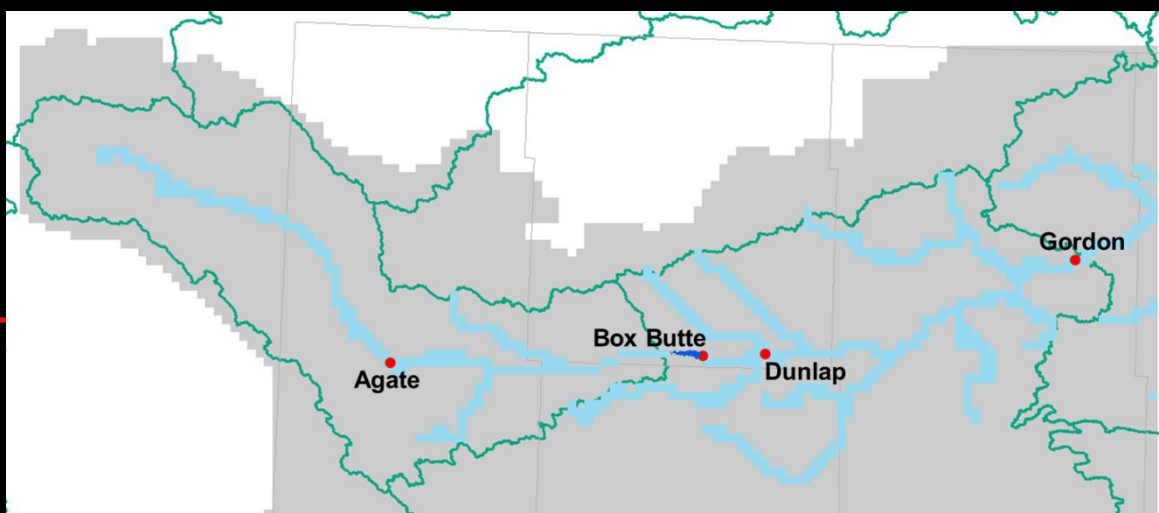
- Alternative 2 scenario – Canal Recharge



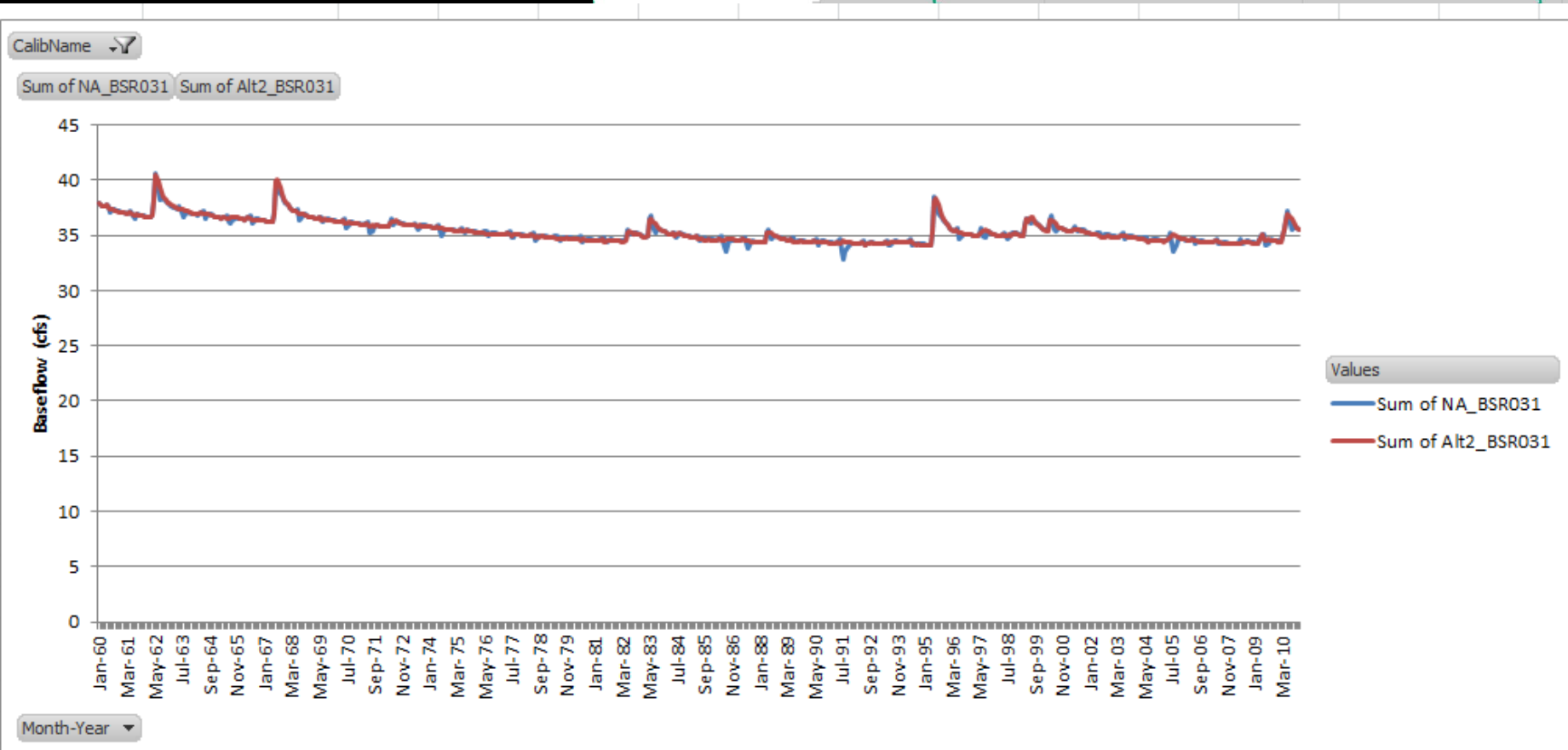
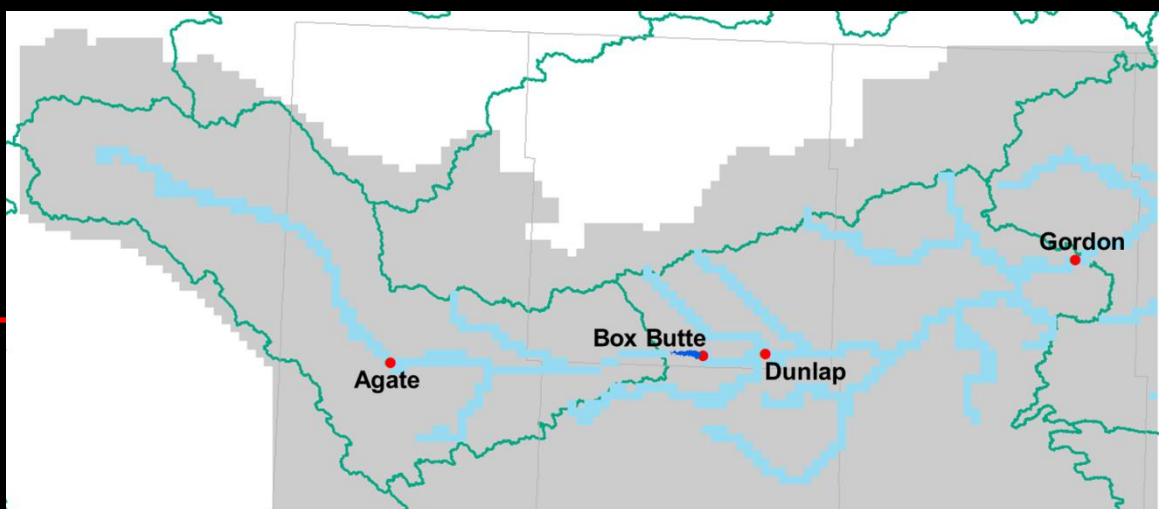
Box Butte to Dunlap

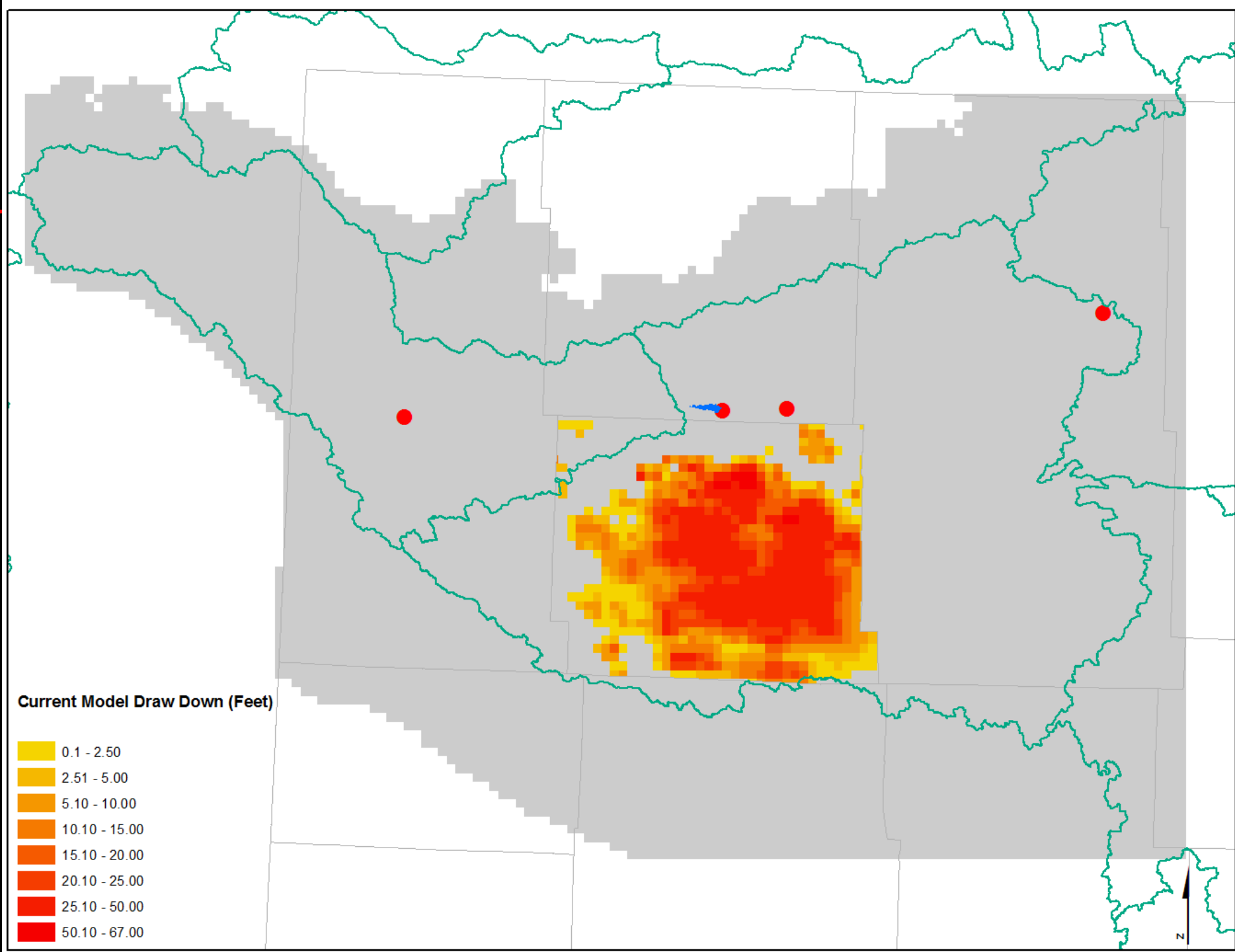


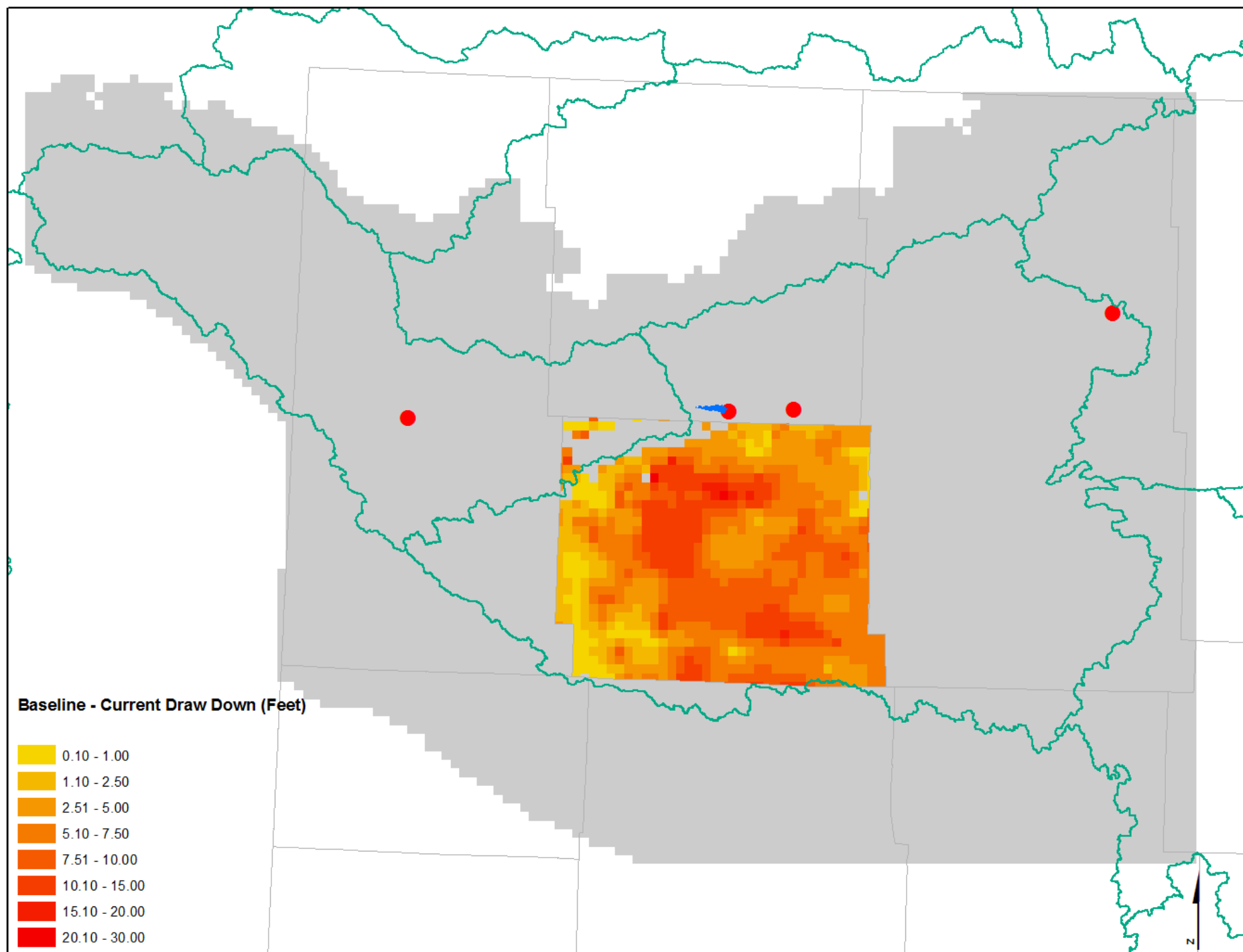
Dunlap to Gordon



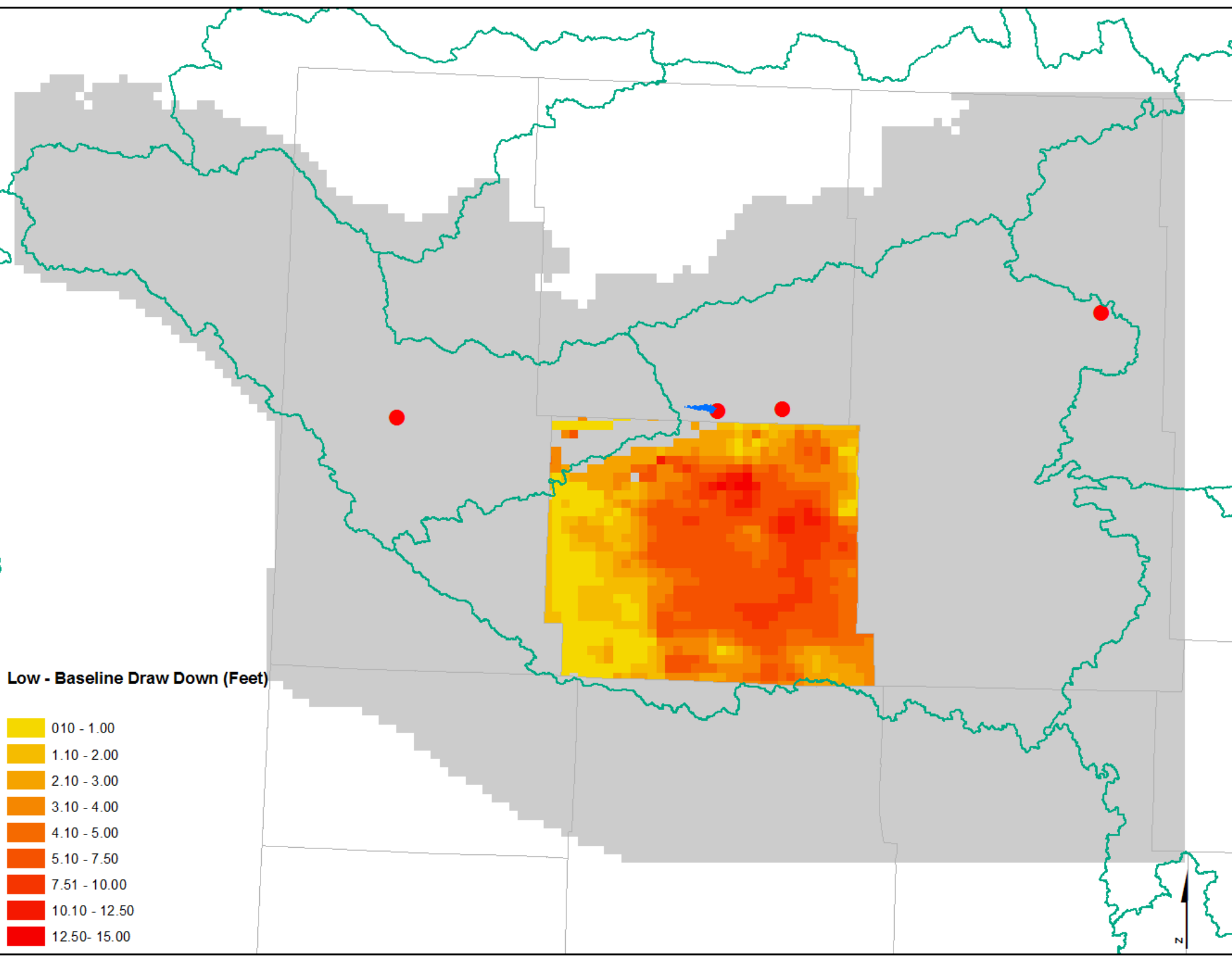
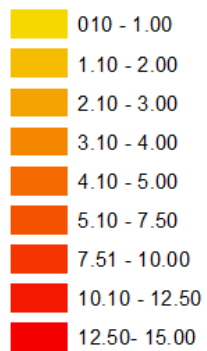
Gordon to Edge

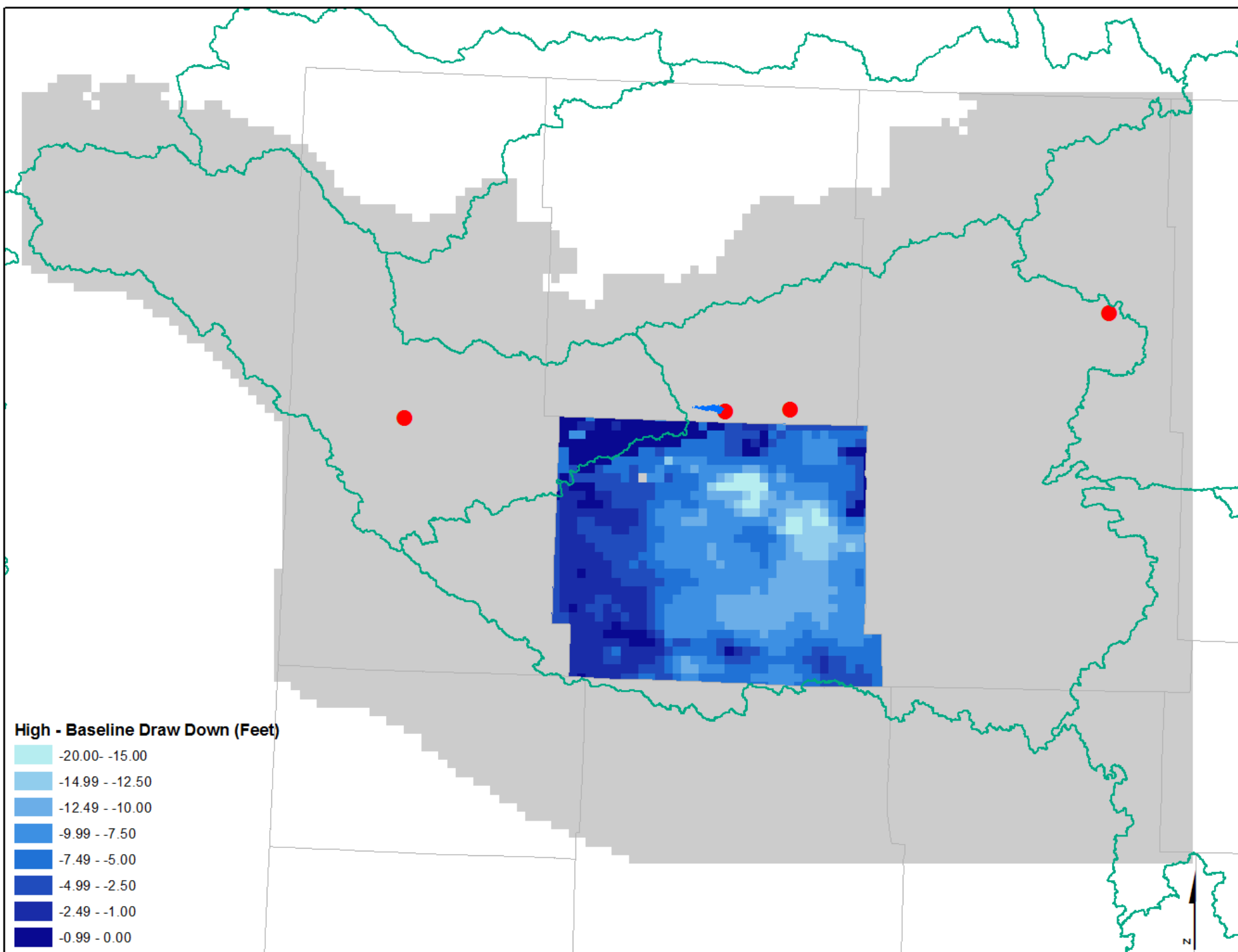






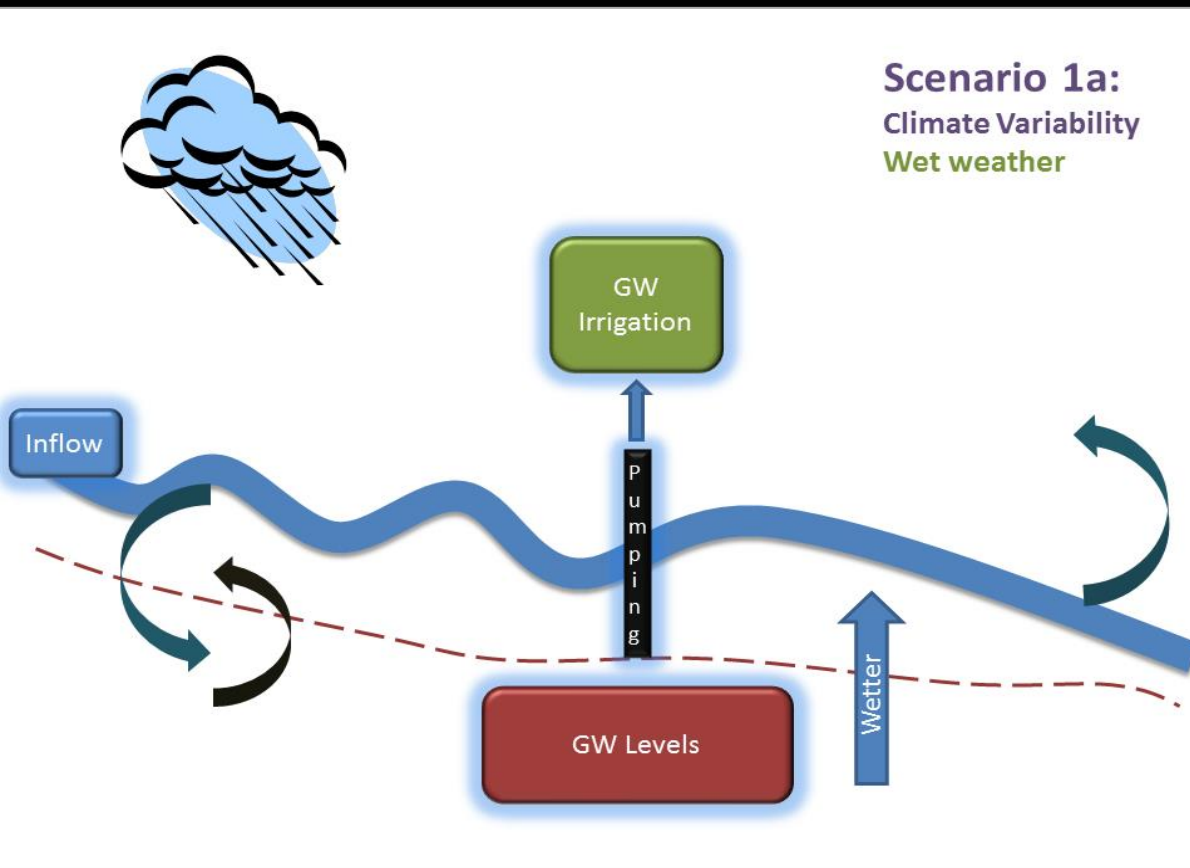
Low - Baseline Draw Down (Feet)





Management Scenarios

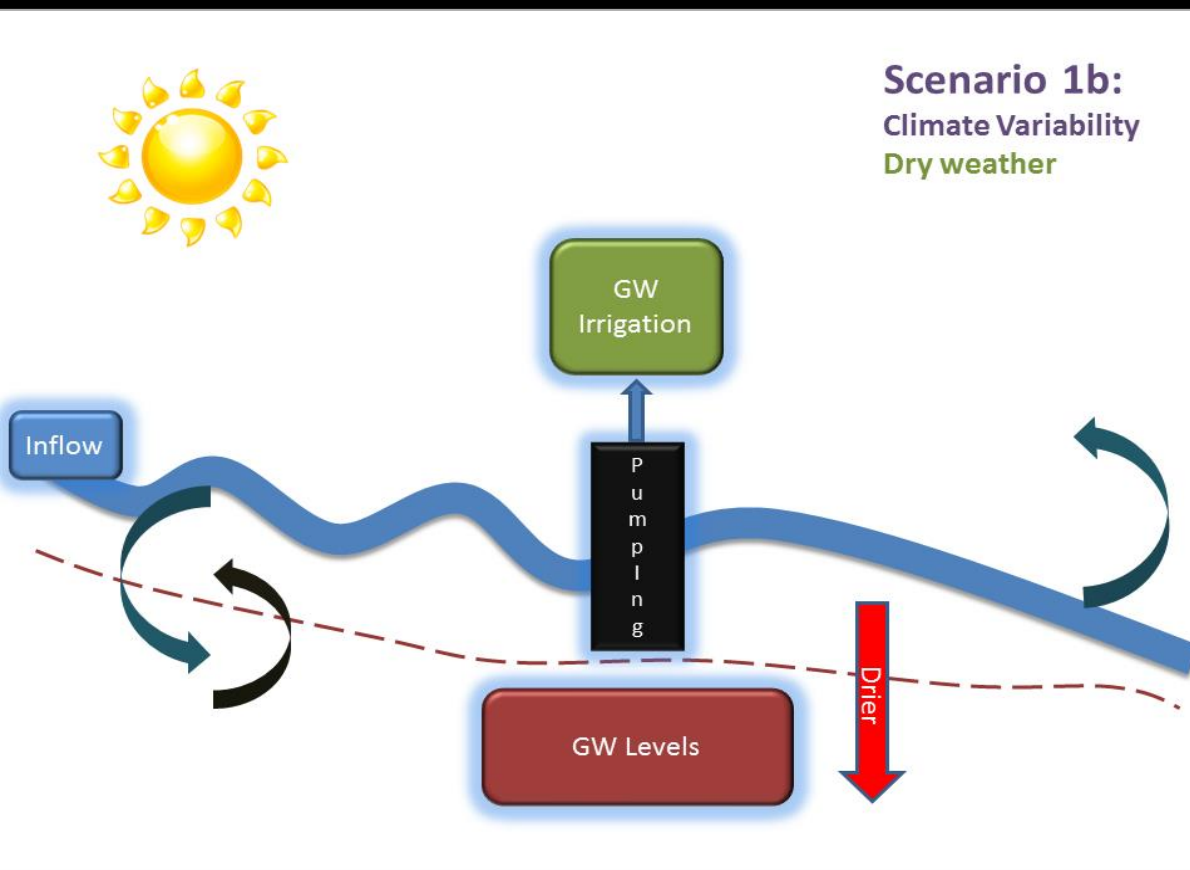
Scenario 1a: Wet Climate



Model
simulation of
wetter weather
condition

Management Scenarios

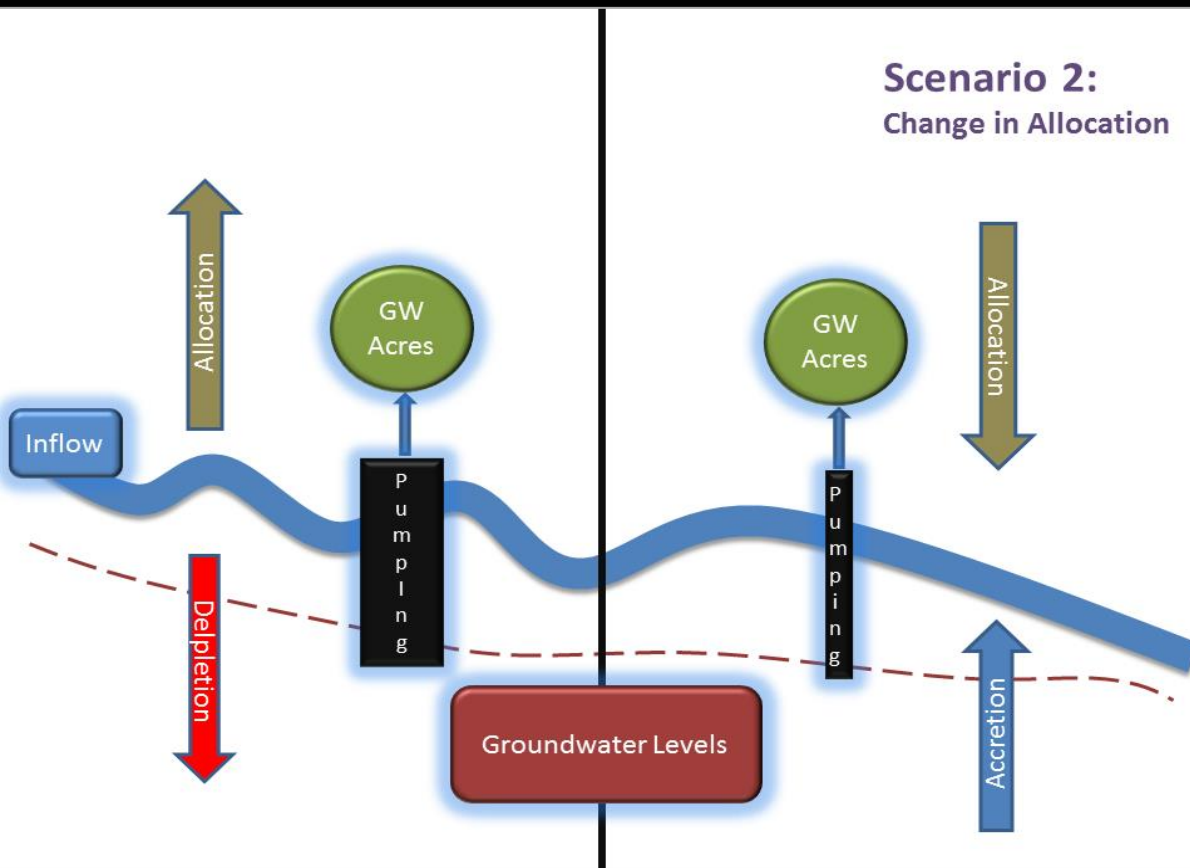
Scenario 1b: Dry Climate



Model
simulation of
drier weather
condition

Management Scenarios

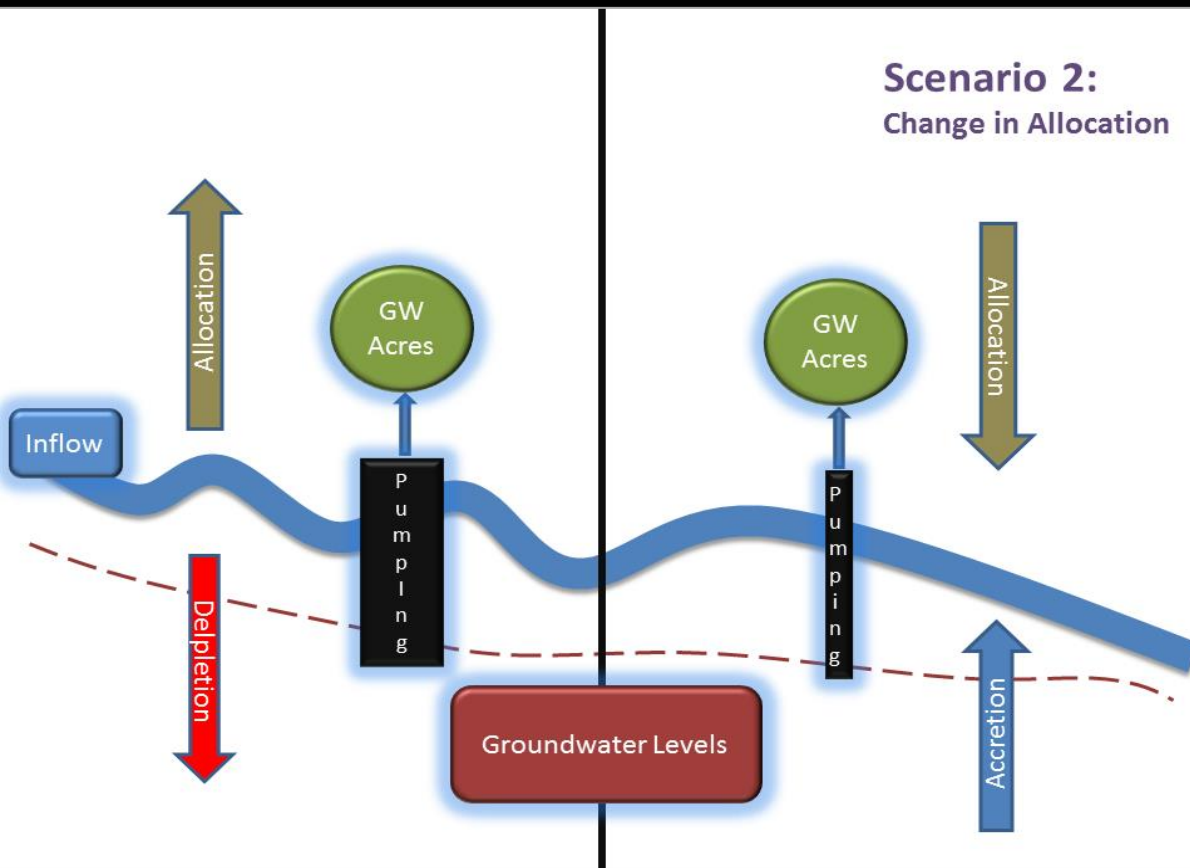
Scenario 2: Change in Allocation



Model simulation of
change in allocated
groundwater
pumping condition

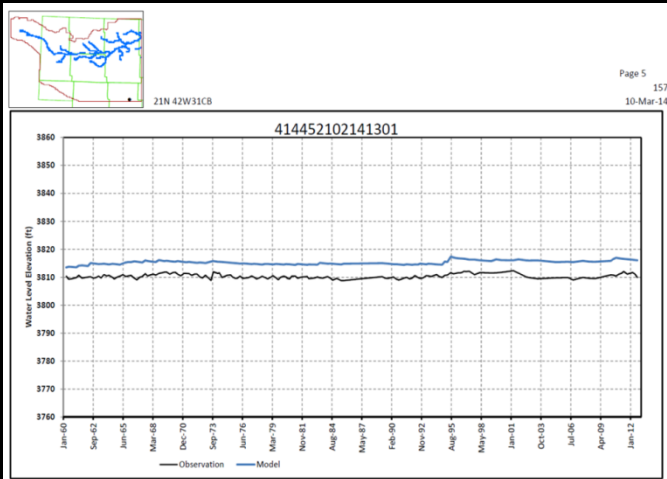
Management Scenarios

Scenario 3: Change in Cropland Condition

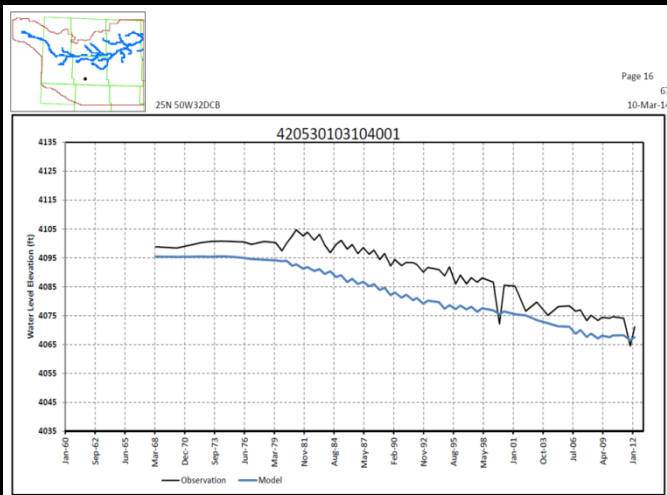


Model simulation of
changes in irrigated
acreage and crop
type

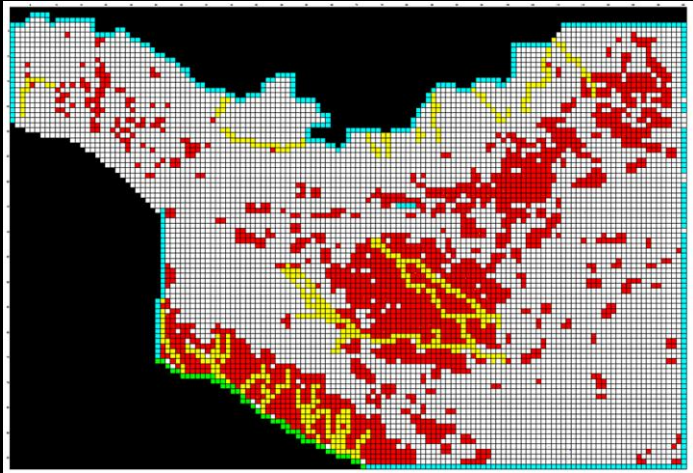
Refinement of UNW Model



- Better data is now available
- Recalibration of model
 - Compare modeled data to updated meter data
 - Recalibrate model - modify model to more closely match observed conditions



Potential Scenarios



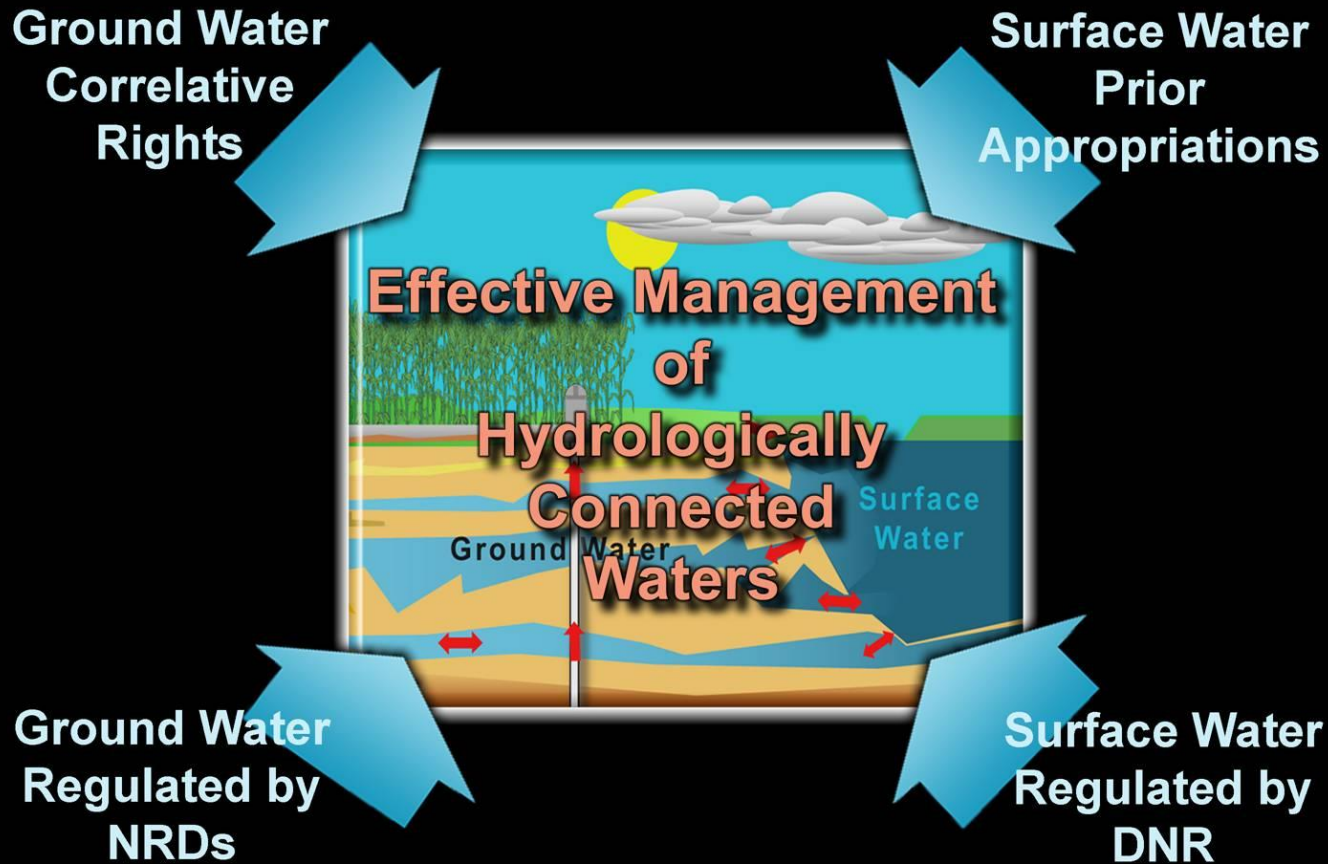
Please give us
your input after
the presentation!

- Future use of the UNW Model
 - What does the public want to know about potential future conditions?
 - What management actions have occurred and how can their impacts be analyzed?
 - What information would be useful to the UNW water users?



BASIN-WIDE PLANNING

Background



Basin-Wide Planning

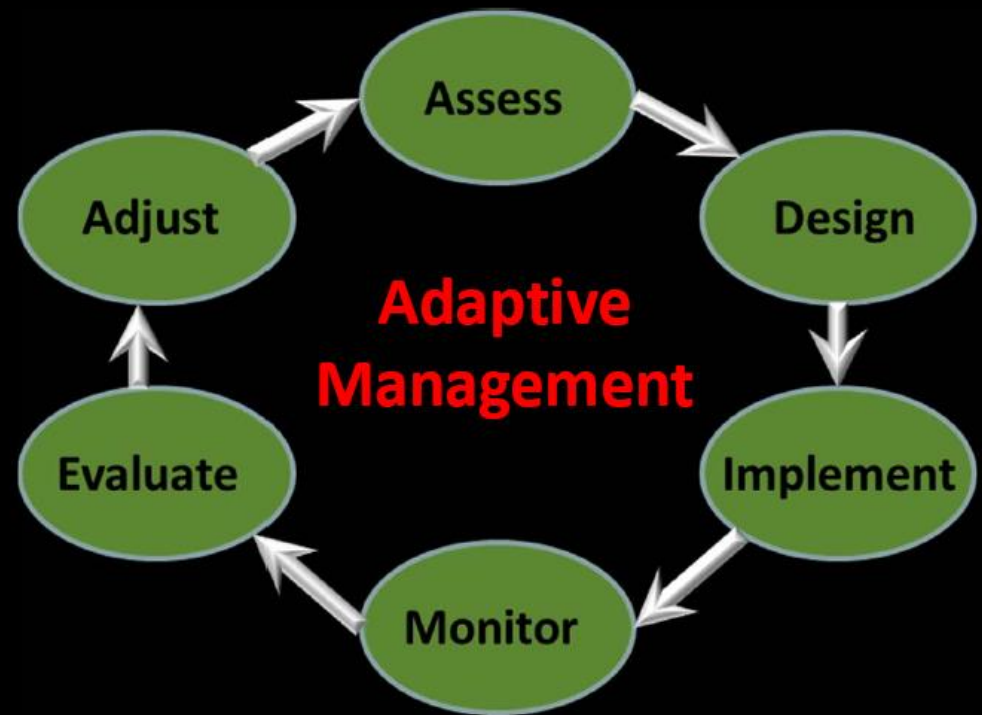
- Voluntary BWP - Niobrara Basin
- UNWNRD, MNNRD, LNNRD, UENRD, ULNRD
- Not required as it was in the Republican Basin
- Goal
 - **achieve and sustain long-term balance between water uses and supplies.**



The Niobrara River Basin and sub-basins

What is a Basin-Wide Plan?

- Pro-active approach to address opportunities & issues
- Combines surface and groundwater management
- Jointly developed between local NRDs and DNR
- Basin-wide, systematic approach
- Flexible—Adaptive Management



Advantages to Basin-Wide Planning

- Framework for consistent Basin goals & objectives
- Addresses connectivity between NRDs
- Projects—do not have to stop at NRD boundaries
- Monitoring—Agreed upon tools and Dissemination of data
- Would not require NRD to have IMP to participate

Basin-Wide Survey

- Survey
 - <http://go.unl.edu/39wo>
 - Deadline is March 11, 2015
 - Your input is appreciated

PUBLIC INPUT





Tim Freed, M.S.

Integrated Water Management Coordinator
&

Mahesh Pun, M.S.

Integrated Water Management Analyst